

APPENDIX B: FIELD SITE ASSESSMENTS

4-Stream, 3165 BUFFALO RD, -77.117102, 39.488838

| | |
|--|---|
| Created | 2018-04-18 20:58:43 UTC by Akta Patel |
| Updated | 2018-08-02 17:04:31 UTC by Akta Patel |
| Location | 39.488838, -77.117102 |
| FulcrumID | 4-Stream |
| PIN | 44321 |
| TAX_ACCT | 1119393429 |
| Address | 3165 BUFFALO RD |
| Comments | Site Walk. Line seems off from flow accumulation lines. May consider stopping at pond....Upper reach of stream - upstera is ag drainage ditch, downstream is ag pond. Small wooded buffer. Field visit 6/11. |
| XCOORD | -77.117102 |
| YCOORD | 39.488838 |
| Stream_Len | 446.05 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=19&AccountNumber=390233 |
| Reach Setting | Headwaters stream. Reach starts and ends in brush/forest area, on edge of forested area on left and grassed field on right |
| Dominant Bed Material | Gravel |
| Bed Material Notes | Cobbles and clay |
| Dominant Bed Form Morphology | Plane-bed |
| Vertical Confinement | Culverts, built stone cascade d/s of culvert |
| Vertical Adjustments | Headcuts, woody debris jam w/aggregation u/s of it, d/s of headcut |
| Dominant Plan form geometry | Single Thread Straight |
| Plan Form Geometry Notes | Gentle meanders |
| Floodplains/Terraces Notes | Moderately entrenched w/ occasional floodplain access, floodplain heights vary |
| Lateral confinement | Concrete |
| Lateral Confinement Notes | Concrete bags around culvert |
| Lateral adjustments | Bank erosion, Undercut trees |
| Bank Erosion | Mild to moderate |
| Local disturbance contributing to bank erosion | Possibly Conversion of forest to field |

Bank Characteristics

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|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 5 |
| Average Bank Height | 3 |
| Min Bank Height | 2 |

In-Stream Habitat Resources or Concerns

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|--|---|
| In-Stream Habitat Resources and Concerns | Habitat/flow diversity, LWD |
| Baseflow Depth | Could be a concern - not on raining day |
| Fish Passage | At culvert |
| Shading | Varries, but not an issue |
| Habitat/flow diversity | Low diversity, pools d/s of headcut and culvert |
| Woddy Debris | Debris jam |

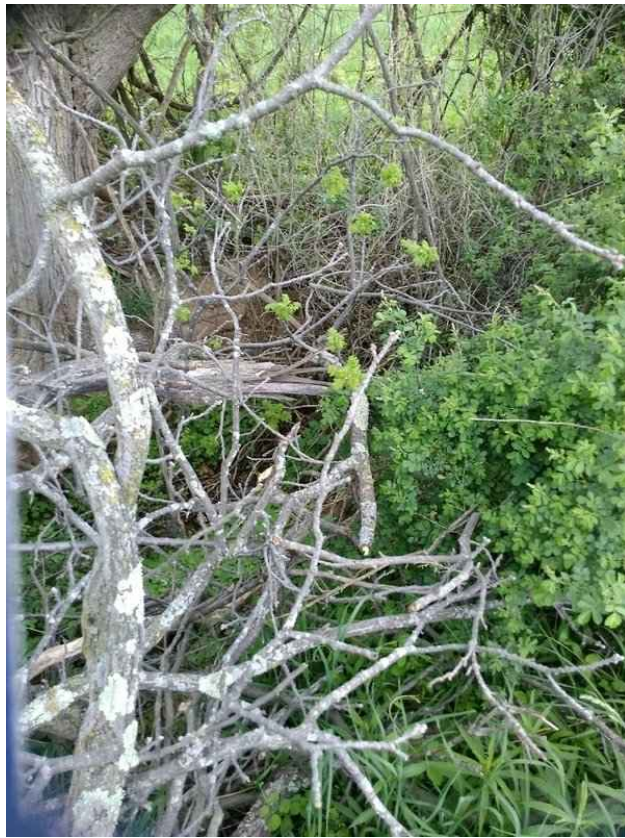
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|-------------------------------------|---|
| Overhanging banks | Some |
| Riffle embeddedness | Only one riffle |
| Floodplain Connectivity | 2 - incised w limited, valley not flat, limited, but could still have space for floodplain reconnection |
| Lateral Stability of Stream Channel | Stable |
| Riparian Zone | Dominant native and invasive species, Canopy coverage, Understory, Mature/specimen trees, Shrubs |
| Riparian Zone Notes | Mature and dense corridor, specimen trees reaching 50 ft plus. Heavy invasives, dense brush in some areas. Mainly on left w occasional trees and grass on right. Dense understory and shrubs. Japanese grass herbaceous |
| Percent Woody | 95% wooded on left, 10-20% on right |
| Percent Herbaceous | 5% on left, 80-90% on r |
| Percent Invasive | 25-50% on left, 25-50% on r |
| Canopy Percent | 75% |
| Aquatic Habitat Notes | Sporadic deeper pools d/s of headcut and culvert |
| Infrastructure | Culverts |
| Environmental Impacts | Tree removal, Soil conditions |
| Cultural/Historical Impacts | Pet cemetery, crosses against large sycamore |
| Restoration Ideas | Floodplain reconnection, culvert replacement, grade control at headcut and wd jam, invasive mgmt, riparian restoration |

8-Stream, 14802 NEW WINDSOR RD, -77.148581, 39.496155

| | |
|------------|---|
| Created | 2018-04-18 20:58:44 UTC by Akta Patel |
| Updated | 2018-05-11 18:01:23 UTC by Akta Patel |
| Location | 39.496155, -77.148581 |
| FulcrumID | 8-Stream |
| PIN | 45376 |
| TAX_ACCT | 1119391094 |
| Address | 14802 NEW WINDSOR RD |
| Comments | Site Walk. Be mindful while out in the field regarding the stream and how close it is to the pond embankment.....Headwaters stream through small wooded buffer and around ag pond. |
| XCOORD | -77.148581 |
| YCOORD | 39.496155 |
| Stream_Len | 1,061.59 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=19&AccountNumber=389448 |

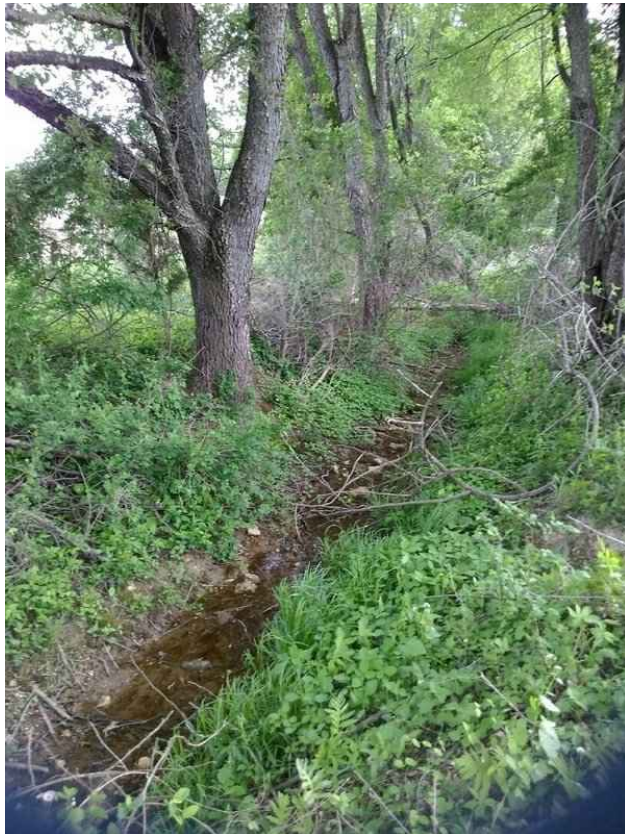
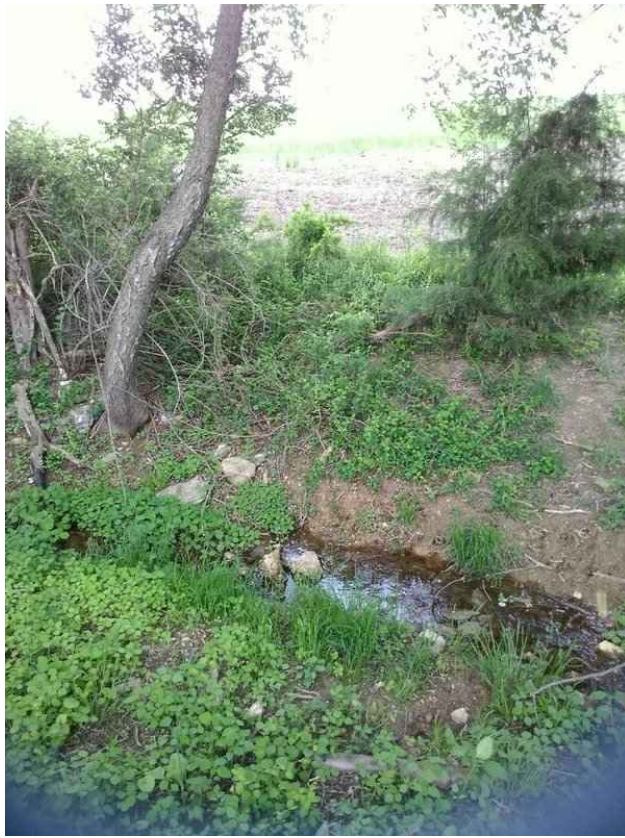
Photos



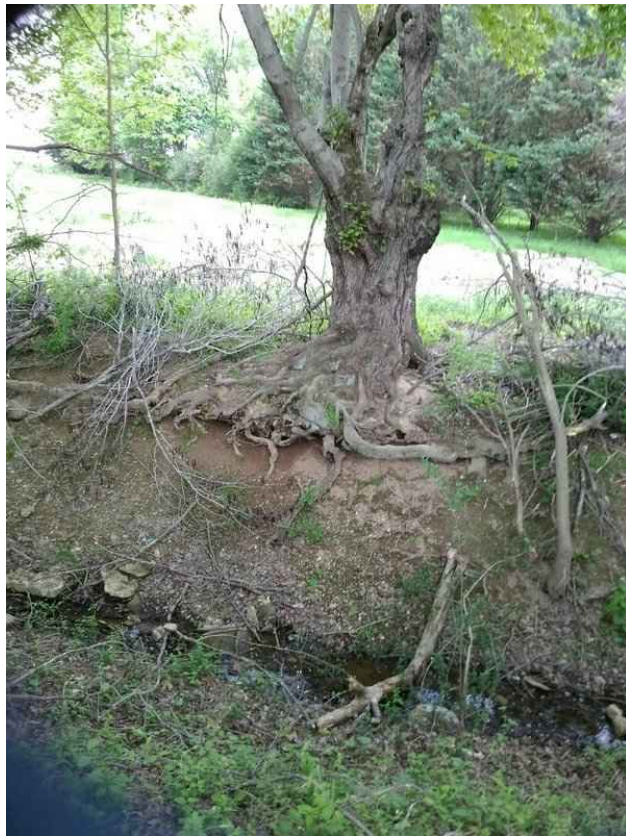














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| Reach Setting | U/s, d/s dried bed- does not extent to property boundary |
| Dominant Bed Material | Silt/clay, Gravel |
| Secondary Bed Material | Boulder |
| Bed Material Notes | Predominantly silt, clay, and gravel, plus mixture of cobble and boulder |
| Dominant Bed Form Morphology | little to no flow |
| Secondary Bed Form Morphology | Plane-bed |
| Bed Form Morphology Notes | High slope, some cascade |
| Vertical Confinement | none |
| Vertical Adjustments | Side bars |
| Vertical Adjustments Notes | Some sidebars - small in size Some nickpoints due to steep slopes. No serious headcut observed. Hay bales placed at some locations (to dissipate energy?) |
| Dominant Plan form geometry | Single Thread Straight |
| Plan Form Geometry Notes | High energy environment during large storm event due to steep slope |
| Floodplains/Terraces Notes | No floodplain observed. More apparent where stream starts to flatten out. Channel bank slope continues same as upland slope |
| Lateral confinement | none |
| Lateral Adjustments Notes | None. Banks mostly overgrown. Trees with exposed roots u/s. Some small side bars. |
| Bank Erosion | No signs of active bank erosion |

Bank Characteristics

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|------------------------------|-------------------------------------|
| Dominant Bank Materials | Silt/Clay |
| Dominant Bank Material Notes | Silt/clay with gravel, cobble, etc. |
| Max Bank Height | 5-12 ft, average 10 ft |
| Average Bank Height | 10 ft |
| Min Bank Height | 5 |

In-Stream Habitat Resources or Concerns

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|--|------------------------|
| In-Stream Habitat Resources and Concerns | Habitat/flow diversity |
| Baseflow Depth | 5 inches max |

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| Shading | 75-100% |
| Woddy Debris | 50% |
| Overhanging banks | Present throughout |
| Floodplain Connectivity | 2 - Incised with limited floodplain area |
| Lateral Stability of Stream Channel | 1 - Stable to moderately stable |
| Riparian Zone Notes | Approx 20ft wide buffer with primarily maple trees, understory flowering dogwood present. invasives: tree of heaven present, lambs quarter, multiflora. Lwd present throughout |
| Percent Woody | 50% |
| Percent Herbaceous | 50% |
| Percent Invasive | 75% |
| Canopy Percent | 75-100% |
| Aquatic Habitat Notes | Very little baseflow... not enough to sustain fauna. Shading throughout. |
| Infrastructure | |
| Infrastructure Notes | Pond discharged into channel through 12" CM pipe (partially submerged) |
| Environmental Impacts | Riparian zone, Steep slopes |
| Environmental Impacts Notes | None |
| Cultural/Historical Impacts | None |
| Materials for Reuse | Trees, boulders |
| Restoration Ideas | Remove dumping. Widen riparian buffer, Step pools, RSC Weir installation, grade control structures |

9-Stream, 10345 FOUNTAIN SCHOOL RD, -77.201601, 39.518828

| | |
|------------|---|
| Created | 2018-04-18 20:58:44 UTC by Akta Patel |
| Updated | 2018-06-11 16:29:28 UTC by Akta Patel |
| Location | 39.518828, -77.201601 |
| FulcrumID | 9-Stream |
| PIN | 49210 |
| TAX_ACCT | 1117358103 |
| Address | 10345 FOUNTAIN SCHOOL RD |
| Comments | Site Walk.....Could continue upstream to roadway along one or both branches - erosion is evident along both. |
| XCOORD | -77.201601 |
| YCOORD | 39.518828 |
| Stream_Len | 1,243.51 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=358103 |

Photos







































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|------------------------------|---|
| Reach Setting | Broad valley with forested right side, open farmed field/pasture/grass on left side |
| Dominant Bed Material | Gravel |
| Dominant Bed Form Morphology | Plane-bed |
| Bed Form Morphology Notes | Debris/beaver dam. High flow /flooding makes other vertical features hard to see |
| Vertical Confinement | Dams |
| Vertical Confinement Notes | Culvert at d/s end, beaver/woody debris dams, 1-2 steps in channel - unable to id materials |
| Vertical Adjustments Notes | None |
| Dominant Plan form geometry | Single Thread Meandering |
| Floodplain/Terraces | Floodplains (L/R) |
| Floodplains/Terraces Notes | Very well connected, dams contribute to that. Woody debris on floodplain. Woody debris loading. Wide flat valley. Less connection d/s |
| Lateral confinement | Revetments |

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| Lateral Confinement Notes | Brick and concrete revetment d/s meander next to driveway |
| Lateral adjustments | Bank erosion, Undercut trees |
| Lateral Adjustments Notes | Bank erosion d/s, undercut bank d/s of revetment, some trees inundated, low points/preferential flow behind |
| Bank Erosion | Mild to moderate |
| Local disturbance contributing to bank erosion | Conversion tobgrassed from forest |

Bank Characteristics

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|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 3 |
| Average Bank Height | 1 |
| Min Bank Height | 0 |

In-Stream Habitat Resources or Concerns

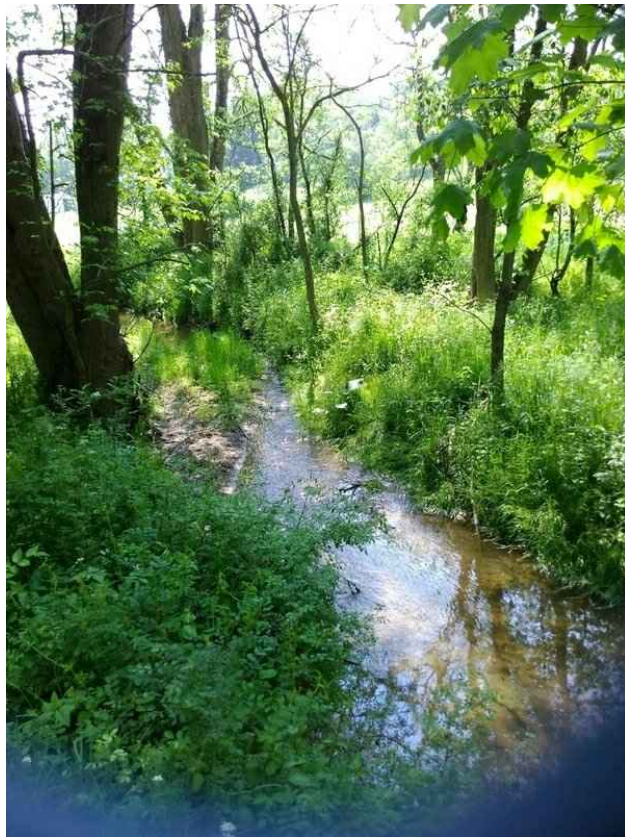
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| Baseflow Depth | Probably okay |
| Fish Passage | Beaver/debris dam barrier |
| Shading | Good |
| Habitat/flow diversity | Unable to tell if there are deeper pools, probably not terrible, not great |
| Woddy Debris | High loading from u/s. Lots on banks and debris dams or beaver dams span channel at several locations, block much of flow at others |
| Overhanging banks | Short section d/s |
| Riffle embeddedness | Unknown |
| Floodplain Connectivity | Connected |
| Lateral Stability of Stream Channel | Stable - esp u/s |
| Riparian Zone Notes | Herbaceous, mature trees, understory. Natural forest on right, mowed grass to nearly top of bank on left side. Jewelweed |
| Percent Woody | 50-75% |
| Percent Herbaceous | 75% |
| Percent Invasive | 25% |
| Canopy Percent | 25-50% |
| Aquatic Habitat Notes | Woody debris, no fauna seen |
| Infrastructure | Culverts |
| Environmental Impacts | Tree removal |
| Cultural/Historical Impacts | Driveway, flagpole, gazebo in floodplain near stream |
| Restoration Ideas | Grading d/s and bioengineering, woody debris mgmt, invasives mgmt |

10-Stream, 10413 FOUNTAIN SCHOOL RD, -77.201324, 39.516858

| | |
|------------|---|
| Created | 2018-04-18 20:58:44 UTC by Akta Patel |
| Updated | 2018-05-14 19:35:34 UTC by Akta Patel |
| Location | 39.516858, -77.201324 |
| FulcrumID | 10-Stream |
| PIN | 49993 |
| TAX_ACCT | 1117359878 |
| Address | 10413 FOUNTAIN SCHOOL RD |
| Comments | Site Walk.....Could continue upstream to roadway along one or both branches - erosion is evident along both. |
| XCOORD | -77.201324 |
| YCOORD | 39.516858 |
| Stream_Len | 411.33 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=358103 |

Photos













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| Reach Setting | D/s fence line property, adjacent to agriculture operation. U/s tree line. Mainly forested |
| Dominant Bed Material | Gravel |
| Secondary Bed Material | Silt/clay, Cobble |

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| Bed Material Notes | Riffles throughout |
| Dominant Bed Form Morphology | Plane-bed |
| Secondary Bed Form Morphology | Pool-riffle |
| Vertical Confinement | none |
| Vertical Adjustments | Side bars, Mid-channel bars |
| Dominant Plan form geometry | Single Thread Meandering |
| Floodplain/Terraces | Floodplains (L/R) |
| Floodplains/Terraces Notes | No terraces. Valley. R- steep in some areas u/s |
| Lateral confinement | none |
| Lateral adjustments | Bank erosion, Undercut trees, Neck cutoff |
| Lateral Adjustments Notes | Neck cut off u/s |
| Bank Erosion | Throughout, outer bends. Moderate |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 12 |
| Average Bank Height | 4-6 |
| Min Bank Height | 2 |

In-Stream Habitat Resources or Concerns

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|--|--|
| In-Stream Habitat Resources and Concerns | Shading, Habitat/flow diversity, LWD, Riffle embeddedness |
| Baseflow Depth | Adequate |
| Fish Passage | No barriers |
| Shading | 50% |
| Habitat/flow diversity | Adequate, macros observed |
| Woody Debris | Large Woody Debris throughout |
| Overhanging banks | No |
| Riffle embeddedness | Moderrate |
| Floodplain Connectivity | Incised with limited, 2.5-3 |
| Lateral Stability of Stream Channel | Moderate |
| Riparian Zone | Dominant native and invasive species, Canopy coverage, Understory, Mature/specimen trees, Shrubs, Herbaceous |
| Riparian Zone Notes | Primarily grasses. Mature trees present. Multiflora |
| Percent Woody | 75% |
| Percent Herbaceous | 100% |
| Percent Invasive | 50% |
| Canopy Percent | 50-75% |
| Aquatic Habitat Notes | Macros, baseflow adequate. Moss and algae present. |
| Environmental Impacts | Riparian zone, Tree removal, Shading, Soil conditions, Steep slopes |
| Materials for Reuse | LWD. |
| Restoration Ideas | Bank stabilization. Flood plain reconnection. Riparian buffer planting. Relocate closer to valley |

13-Stream, 13202 COPPERMINE RD, -77.200792, 39.508297

| | |
|--|---|
| Created | 2018-04-18 20:58:44 UTC by Akta Patel |
| Updated | 2018-06-11 15:23:45 UTC by Akta Patel |
| Location | 39.508297, -77.200792 |
| FulcrumID | 13-Stream |
| PIN | 72135 |
| TAX_ACCT | 1117364952 |
| Address | 13202 COPPERMINE RD |
| Comments | Site Walk.....Could continue upstream to roadway along one or both branches - erosion is evident along both. |
| XCOORD | -77.200792 |
| YCOORD | 39.508297 |
| Stream_Len | 1,243.15 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=358103 |
| Reach Setting | Meanders through narrow tree/brush corridor along property line, upper reach within cattle pasture, lower reach along grassed field. D/s boundary is fence/tree line |
| Dominant Bed Material | Gravel |
| Bed Material Notes | Small gravel |
| Dominant Bed Form Morphology | Pool-riffle |
| Secondary Bed Form Morphology | Plane-bed |
| Bed Form Morphology Notes | Higher flow during site visit |
| Vertical Confinement Notes | Unidentified grade control at bndry btwn upper and lower reaches, lwd jam at d/s limit |
| Vertical Adjustments | Headcuts, Side bars |
| Vertical Adjustments Notes | Gravel side bars |
| Dominant Plan form geometry | Single Thread Meandering |
| Secondary Plan form geometry | Multiple Thread Braided |
| Plan Form Geometry Notes | D/s end of reach multiple thread braided - verify definition - vegetated islands, preferential flow paths over floodplain evident, would create cutoff-like flow at higher flows |
| Floodplain/Terraces | Floodplains (L/R) |
| Floodplains/Terraces Notes | Floodplain present on both sides, generally alternates at lower elevation w higher elevations |
| Lateral Confinement Notes | None |
| Lateral adjustments | Bank erosion, Meander migration, Undercut trees, Neck cutoff, Chute cutoff |
| Lateral Adjustments Notes | Some undercut trees at tight meander bends, meander migration |
| Bank Erosion | Moderate to severe |
| Local disturbance contributing to bank erosion | Cattle in upper reach - direct access to stream, conversion of corridor to grass field/meadow |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 3-4 |
| Average Bank Height | 2-3 |
| Min Bank Height | 1 |

In-Stream Habitat Resources or Concerns

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|-------------------------------------|--|
| Baseflow Depth | Not a concern |
| Fish Passage | No constraints |
| Shading | Little to none in upper reach |
| Habitat/flow diversity | Moderate |
| Woody Debris | Present, more so d/s |
| Overhanging banks | None |
| Riffle embeddedness | Inconclusive |
| Floodplain Connectivity | Connected |
| Lateral Stability of Stream Channel | Silty banks, nothing preventing movement. Unstable, but on the fence - 3 |
| Riparian Zone Notes | Narrow strip, wider d/s than u/s, mature trees 40ft plus, herbaceous, few shrubs/understory |
| Percent Woody | 0-25% u/s, 50-75% d/s |
| Percent Herbaceous | 50-75% |
| Percent Invasive | 0-25% |
| Canopy Percent | 0-25% u/s, 50-75% d/s |
| Aquatic Habitat Notes | Some pools, some woody debris, not much. U/s reach very little habitat |
| Infrastructure | fenceline |
| Environmental Impacts | Tree removal, Soil conditions |
| Cultural/Historical Impacts | Cow pasture |
| Restoration Ideas | Bioengineering, invasive removal and riparian restoration, take care w restoration in braided area d/s - i.e. determine meander beltwidth and set treatment along edges? |

21-Stream, 10120 CLEMSONVILLE RD, -77.174038, 39.516545

| | |
|------------|---|
| Created | 2018-04-18 20:58:45 UTC by Akta Patel |
| Updated | 2018-05-10 19:47:45 UTC by Akta Patel |
| Location | 39.516545, -77.174038 |
| FulcrumID | 21-Stream |
| PIN | 50416 |
| TAX_ACCT | 1117363514 |
| Address | 10120 CLEMSONVILLE RD |
| Comments | Site Walk. Combine with the entire proposed corridor. Ag IPP Easement coordination.....Combined all indicated reaches. One trib appears to be ag ditch. One can be extended w/in easement |
| XCOORD | -77.174038 |
| YCOORD | 39.516545 |
| Stream_Len | 4,720.17 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=363077 |

Photos











































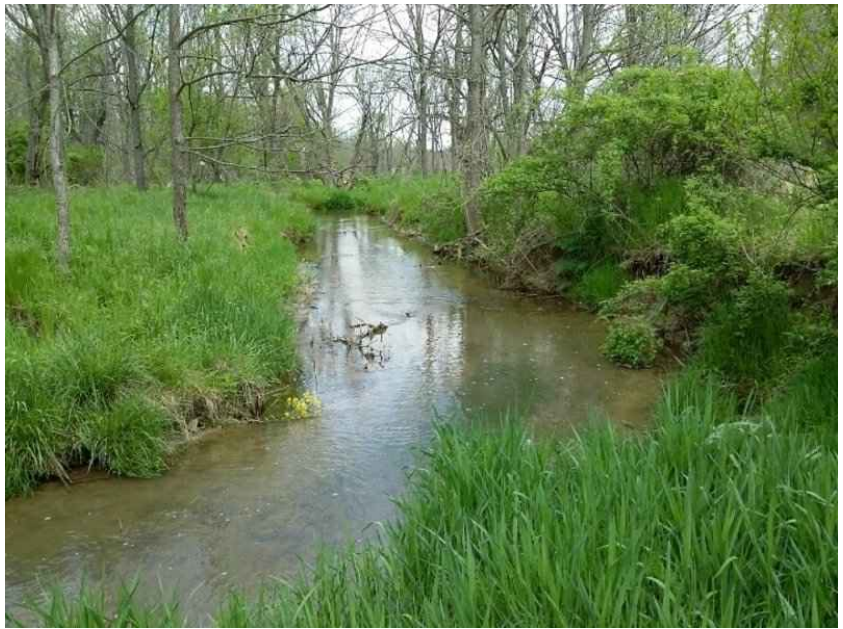














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| Reach Setting | Intersection with Clemons ville Road is upstream boundary, downstream is neighbor's property - no clear marking feature |
| Dominant Bed Material | Silt/clay |
| Secondary Bed Material | Gravel |
| Bed Material Notes | Gravel in riffles and some transition areas, silt /clay in pools and point bars |
| Dominant Bed Form Morphology | Plane-bed |
| Secondary Bed Form Morphology | Weak pool-riffle |
| Vertical Confinement | Culverts |
| Vertical Confinement Notes | Upstream road culvert - 4ft metal with concrete base and headwall, small vertical drop with pool downstream 4 metal culverts next to one another, all appeared to have sediment and standing water in them, two left ones flowed the fastest, others partially blocked 6ft metal bent culvert with farm road on top. Stream trying to meander around culvert and eroding bank just upstream |
| Vertical Adjustments | Point bars, Side bars, Mid-channel bars |
| Vertical Adjustments Notes | Silt/clay point bars, gravelly mid channel bars |
| Dominant Plan form geometry | Single Thread Meandering |
| Floodplain/Terraces | Floodplains (L/R), Terraces (abandoned floodplain) |
| Floodplains/Terraces Notes | Terraces on both sides, on the inside meander bends and transition zone. Floodplains on both sides, large and unconfined |
| Lateral confinement | None |
| Lateral adjustments | Bank erosion, Meander migration, Undercut trees, Neck cutoff, Chute cutoff, Point bar development |
| Lateral Adjustments Notes | Meander cutoffs/abandoned oxbows of all ages |
| Bank Erosion | Moderate to severe |
| Local disturbance contributing to bank erosion | Unknown |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 5 ft |
| Average Bank Height | 3-4 ft |

In-Stream Habitat Resources or Concerns

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|--|---|
| In-Stream Habitat Resources and Concerns | Shading, Habitat/flow diversity, LWD, Overhanging banks, Riffle embeddedness |
| Baseflow Depth | Not a problem |
| Fish Passage | Restricted by upstream culvert |
| Shading | Downstream section is better, but still less than 50%. Upstream section is field, no shading |
| Habitat/flow diversity | Low - weak pools and riffles, often plane bed |
| Woddy Debris | Few- not much wood. More in downstream wooded area |
| Overhanging banks | Present, especially on outer meander bends |
| Riffle embeddedness | Moderate to high |
| Floodplain Connectivity | 3 |
| Lateral Stability of Stream Channel | 3 |
| Riparian Zone | Dominant native and invasive species, Mature/specimen trees, Herbaceous |
| Riparian Zone Notes | Grasses in upstream field portion. Mature ash is dominant tree in wooded downstream section, along with grasses about 24 inches high with long silvery seeds on top. Some box elder, few invasives. A few ailanthus in field. Some scattered garlic mustard |
| Percent Woody | 30 |
| Percent Herbaceous | 100 |
| Percent Invasive | Unknown |
| Canopy Percent | 25-50 |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Algae/macrophytes, frogs, fish, few macros |
| Infrastructure | Culverts |
| Infrastructure Notes | See culvert notes above |
| Environmental Impacts | Wetlands, Riparian zone, Tree removal, Soil conditions |
| Environmental Impacts Notes | Opportunity to limit tree removal - multiple options for stream access |
| Cultural/Historical Impacts | None |
| Materials for Reuse | None |
| Restoration Ideas | Floodplain re-connection Wetland restoration Oxbow enhancement Culvert improvement Legacy sediment in field? |

25-Stream, 14802 TOLL RD, -77.148403, 39.503754

| | |
|------------|---|
| Created | 2018-04-18 20:58:45 UTC by Akta Patel |
| Updated | 2018-05-10 19:54:44 UTC by Akta Patel |
| Location | 39.503754, -77.148403 |
| FulcrumID | 25-Stream |
| PIN | 52058 |
| TAX_ACCT | 1119389138 |
| Address | 14802 TOLL RD |
| Comments | Site Walk. Combine with the entire proposed corridor. Ag IPP Easement coordination....Combined all indicated reaches. One trib appears to be ag ditch. One can be extended w/in easement |
| XCOORD | -77.148403 |
| YCOORD | 39.503754 |
| Stream_Len | 999.57 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=363077 |
| Photos | |

























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|------------------------------|---|
| Reach Setting | Upstream and downstream ends of reach are wetlands. Middle portion of reach is crossed by a roadway and bounded by land heavily used by owner. Appears that owner recently regraded and seeded slopes just upstream of road crossing. |
| Dominant Bed Material | Gravel |
| Secondary Bed Material | Sand |
| Bed Material Notes | Fine gravels and sands |
| Dominant Bed Form Morphology | Pool-riffle |
| Bed Form Morphology Notes | Downstream portion on this lot goes through a wetland complex - shallow, not very steep slope |
| Vertical Confinement | Culverts |
| Vertical Confinement Notes | Concrete elliptical culvert for land bridge 1.5 to 2 ft |
| Vertical Adjustments | Headcuts |

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| Vertical Adjustments Notes | One headcut in section above land bridge - tree/woddy debris as grade control, channel dry and gravelly above, water flowing downstream One headcut below land bridge - large gravelles held in place by clay bed material |
| Dominant Plan form geometry | Single Thread Meandering |
| Plan Form Geometry Notes | Channel loses distinctiveness in wetland area, there are areas of standing water |
| Floodplain/Terraces | Floodplains (L/R) |
| Floodplains/Terraces Notes | Floodplain on both sides, smaller on left side. Above land bridge - landowner has created floodplain. In wooded, stepper area, no floodplain - valley slopes to top of banks |
| Lateral confinement | None |
| Lateral adjustments | None |
| Lateral Adjustments Notes | Some erosion where the stream is driven through, and some in the steeper upstream section |
| Bank Erosion | Wooded area upstream has moderate bank erosion. Reach overall has mild erosion |
| Local disturbance contributing to bank erosion | Stream ford/land bridge |

Bank Characteristics

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|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 3 ft |
| Average Bank Height | 1 ft |
| Min Bank Height | 6 in |

In-Stream Habitat Resources or Concerns

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|--|---|
| In-Stream Habitat Resources and Concerns | Fish passage, Riffle embeddedness |
| Baseflow Depth | No problem |
| Fish Passage | Culvert under land bridge blocks passage |
| Shading | No problem |
| Habitat/flow diversity | Good - pools, rifles, woody debris, wetlands |
| Woddy Debris | Small trees/branches |
| Overhanging banks | Some observed |
| Riffle embeddedness | Mild |
| Floodplain Connectivity | 1 - not incised |
| Lateral Stability of Stream Channel | 1 - stable downstream of land bridge |
| Riparian Zone | Dominant native and invasive species, Mature/specimen trees, Herbaceous |
| Riparian Zone Notes | Downstream of land bridge - sweet flag dominant, also sensitive fern, cattail, jewelweed, willow. Upstream mowed then wooded (short section) then wetland |
| Percent Woody | 20-30 |
| Percent Herbaceous | 80-90 |
| Percent Invasive | Less than 5 |
| Canopy Percent | 0-25 |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Frogs, turtle, fish |
| Infrastructure | Bridges, Roads |
| Infrastructure Notes | Land bridge for road over culvert |
| Environmental Impacts | Wetlands, Riparian zone, Tree removal, Soil conditions |
| Environmental Impacts Notes | The wetland below the land bridge is large - definite wetland impacts |

| | |
|-----------------------------|---|
| Cultural/Historical Impacts | None |
| Materials for Reuse | None |
| Restoration Ideas | <p>Wetland enhancement on both sides of bridge.</p> <p>Regenerative stormwater conveyance upstream (from wetland into stream channel, which has little flow).</p> <p>Culvert improvement.</p> <p>Bank stabilization and riparian landscaping around land bridge</p> |

26-Stream, CLEMSONVILLE RD, -77.168873, 39.50399

| | |
|------------|---|
| Created | 2018-04-18 20:58:45 UTC by Akta Patel |
| Updated | 2018-05-10 20:07:21 UTC by Akta Patel |
| Location | 39.50399, -77.168873 |
| FulcrumID | 26-Stream |
| PIN | 49722 |
| TAX_ACCT | 1119389987 |
| Address | CLEMSONVILLE RD |
| Comments | Site Walk. Combine with the entire proposed corridor. Ag IPP Easement coordination.....Combined all indicated reaches. One trib appears to be ag ditch. One can be extended w/in easement |
| XCOORD | -77.168873 |
| YCOORD | 39.50399 |
| Stream_Len | 998.50 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=363077 |

Photos





Reach Setting

This area is the valley at the base of an old agricultural field. The downstream boundary is marked by a line of trees between fields. An incised but dry channel appears at this boundary (and appears to have a low point just downstream of the boundary), while upstream, in this reach, the channel is dry and the channel bed is at a higher elevation - it appears to have been filled in by sediment over the years. The ground was a little moist, but there was no standing water. Upland tree species, including tree of heaven, were present. Form filled out in office. Do not recommend as a restoration site.

| | |
|------------------------------|------------------------|
| Dominant Bed Material | Silt/clay |
| Secondary Bed Material | Sand |
| Dominant Bed Form Morphology | Plane-bed |
| Vertical Confinement Notes | None |
| Vertical Adjustments Notes | None |
| Dominant Plan form geometry | Single Thread Straight |
| Floodplain/Terraces | Floodplains (L/R) |

| | |
|----------------------------|---|
| Floodplains/Terraces Notes | Floodplain appears to be gently sloped valley |
| Lateral Confinement Notes | None |
| Lateral Adjustments Notes | None |
| Bank Erosion | None - no banks |

In-Stream Habitat Resources or Concerns

| | |
|--|--|
| In-Stream Habitat Resources and Concerns | Baseflow depth, Fish passage, Habitat/flow diversity |
| Baseflow Depth | No flow |
| Floodplain Connectivity | 1 |
| Lateral Stability of Stream Channel | 1 |
| Riparian Zone | Dominant native and invasive species, Canopy coverage, Mature/specimen trees, Herbaceous |
| Aquatic Habitat Notes | No aquatic habitat |
| Infrastructure Notes | None |
| Environmental Impacts Notes | None |
| Cultural/Historical Impacts | None |
| Materials for Reuse | None |
| Restoration Ideas | None - the channel downstream of this reach appears to be in a similar condition to this one - an area where drainage from the old farm field collects, but does not continue downstream as surface flow. There does not appear to be an issue with erosion from surface runoff. No impervious area drains to this point, so a stormwater BMP would not be appropriate here. |

31-Stream, 11602 GREEN VALLEY RD, -77.211159, 39.547152

| | |
|------------|---|
| Created | 2018-04-18 20:58:46 UTC by Akta Patel |
| Updated | 2018-05-10 20:13:05 UTC by Akta Patel |
| Location | 39.547152, -77.211159 |
| FulcrumID | 31-Stream |
| PIN | 48971 |
| TAX_ACCT | 1117366874 |
| Address | 11602 GREEN VALLEY RD |
| Comments | Sie walk. The lower portion was already completed as a stream restoration project it appears.....Shortened reach to end at tie-in to previously restored reach |
| XCOORD | -77.211159 |
| YCOORD | 39.547152 |
| Stream_Len | 1,241.86 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=362666 |

Photos

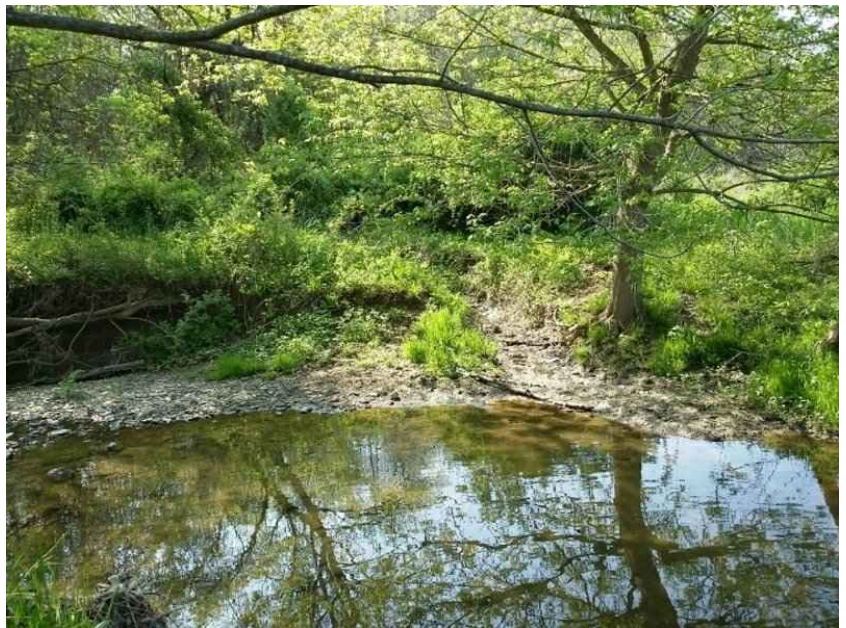
















| | |
|------------------------------|---|
| Reach Setting | Bounded by restored section on upstream end, property fence on downstream end. Un-restored area is destined for restoration by Chesapeake Conservation within the next few years if permitting/funding comes through. |
| Dominant Bed Material | Sand, Gravel |
| Secondary Bed Material | Silt/clay |
| Bed Material Notes | Silt/clay in pools, sand and gravel in rifflee and mid channel bars |
| Dominant Bed Form Morphology | Pool-riffle |
| Vertical Confinement | Bedrock |
| Vertical Confinement Notes | One section of bedrock bed - minimal |
| Vertical Adjustments | Mid-channel bars |
| Vertical Adjustments Notes | Some vegetation on some of the mid channel bars - not all |
| Dominant Plan form geometry | Single Thread Meandering |
| Floodplain/Terraces | Floodplains (L/R) |
| Floodplains/Terraces Notes | Floodplains on both sides along entire reach - not confined |
| Lateral confinement | none |
| Lateral adjustments | Bank erosion, Meander migration, Undercut trees |
| Lateral Adjustments Notes | Outside banks eroded, some mass wasting, |
| Bank Erosion | Moderate |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 6 ft |
| Average Bank Height | 3 ft |
| Min Bank Height | 1 ft |

In-Stream Habitat Resources or Concerns

| | |
|--|---|
| In-Stream Habitat Resources and Concerns | LWD, Overhanging banks, Riffle embeddedness |
| Baseflow Depth | Not a problem |
| Fish Passage | Not a problem |
| Shading | Good |

| | |
|-------------------------------------|---|
| Habitat/flow diversity | Good - pools, riffles, woody debris, undercut trees |
| Woddy Debris | Present - fallen trees causing debris dams |
| Overhanging banks | Some, around undercut trees |
| Riffle embeddedness | Moderate |
| Floodplain Connectivity | 3 - incised, large floodplain |
| Lateral Stability of Stream Channel | 2 - Moderate |
| Riparian Zone | Mature/specimen trees, Herbaceous |
| Riparian Zone Notes | Box elder, willows, sycamore mature and dominant, few tree of heaven Grasses, some garlic mustard, wild carrot |
| Percent Woody | 30 % |
| Percent Herbaceous | 60 % |
| Percent Invasive | 10 % |
| Canopy Percent | 40-60 % |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Minnows, few macros |
| Infrastructure | None |
| Environmental Impacts | Wetlands, Riparian zone, Tree removal, Shading, Soil conditions |
| Environmental Impacts Notes | Wetlands on left floodplain Some tree removal - could potentially minimize and leave some trees in place |
| Cultural/Historical Impacts | None |
| Materials for Reuse | Trees for woody debris Potentially some gravels few cobbles from channel bars |
| Restoration Ideas | Floodplain re-connection Wetland restoration Woody debris/root wads DNR/Chesapeake Conservancy planning stream restoration & wetland restoration |

34-Stream, 11833 BEAVER DAM RD, -77.210263, 39.556103

| | |
|------------|---|
| Created | 2018-04-18 20:58:46 UTC by Akta Patel |
| Updated | 2018-05-10 20:18:41 UTC by Akta Patel |
| Location | 39.556103, -77.210263 |
| FulcrumID | 34-Stream |
| PIN | 72331 |
| TAX_ACCT | 1117362720 |
| Address | 11833 BEAVER DAM RD |
| Comments | Site Walk.....Reach divided by roadways; other reaches identified for site walk up and downstream, could combine |
| XCOORD | -77.210263 |
| YCOORD | 39.556103 |
| Stream_Len | 4,298.14 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=359614 |

Photos











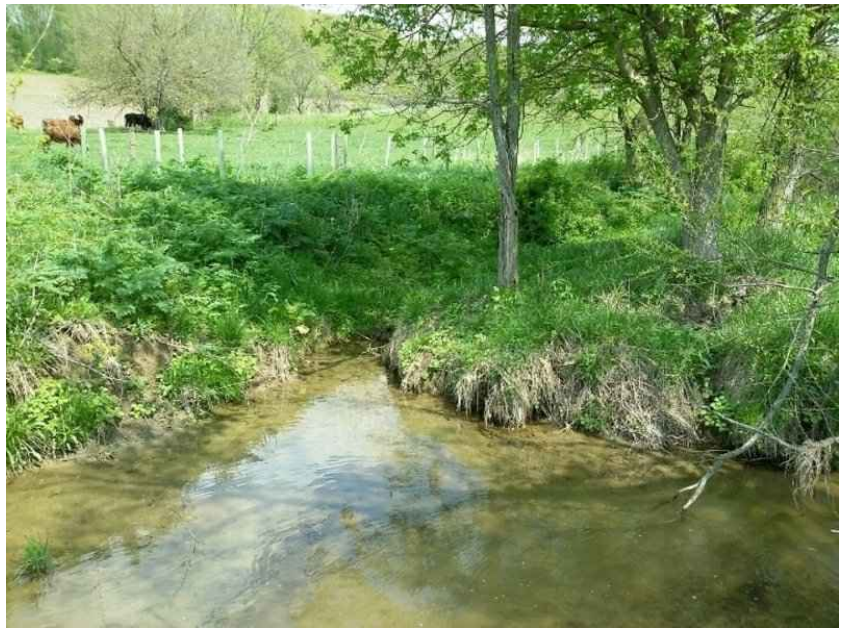




































| | |
|-------------------------------|--|
| Reach Setting | Beaver Dam Road bounds stream reach on both ends. Site is a farm, used for cattle pasture. Constrained by electric fence around concrete cattle stream crossing mid-reach. |
| Dominant Bed Material | Sand, Gravel |
| Secondary Bed Material | Silt/clay |
| Bed Material Notes | Gravel in riffles, sand in pools, silt/clay deposition over hardened bed. Few bedrock outcroppings. |
| Dominant Bed Form Morphology | Pool-riffle |
| Secondary Bed Form Morphology | Plane-bed |
| Vertical Confinement | Concrete |
| Vertical Confinement Notes | Concrete cattle crossing |
| Vertical Adjustments | Point bars, Side bars, Mid-channel bars |
| Vertical Adjustments Notes | Bars were small gravel and sand |
| Dominant Plan form geometry | Single Thread Meandering |

| | |
|--|--|
| Plan Form Geometry Notes | Abandoned meander bends / oxbows, wetlands adjacent to stream, several drainage areas |
| Floodplain/Terraces | Floodplains (L/R) |
| Floodplains/Terraces Notes | Collapsed banks, not terraces. Flat, grassed floodplain One small area on right bank downstream section confined by steep slope with bedrock outcrop beyond. |
| Lateral confinement | Riprap |
| Lateral Confinement Notes | Rip rap at cattle crossing |
| Lateral adjustments | Bank erosion, Meander migration, Undercut trees, Neck cutoff, Chute cutoff, Point bar development |
| Lateral Adjustments Notes | Meander bends show clear history of migration and neck/chute cutoffs in the past. Eroded outer meander bend banks. Few trees, but roots often undercut. Point bars on inner meander bends. Collapsed banks, with vegetation on them. |
| Bank Erosion | Severe |
| Local disturbance contributing to bank erosion | Poor riparian zone quality, grassed banks and few trees |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 8 ft |
| Average Bank Height | 4-6 ft |
| Min Bank Height | 2 ft |

In-Stream Habitat Resources or Concerns

| | |
|--|--|
| In-Stream Habitat Resources and Concerns | Shading, Habitat/flow diversity, Riffle embeddedness |
| Baseflow Depth | Not a concern |
| Fish Passage | Not a concern |
| Shading | Very little shading - few trees in most of reach |
| Habitat/flow diversity | Moderate to low diversity - some pools deep, some riffles had larger sediments |
| Woddy Debris | None |
| Overhanging banks | None |
| Riffle embeddedness | High |
| Floodplain Connectivity | 3 - incised with large floodplain |
| Lateral Stability of Stream Channel | 3 - unstable |
| Riparian Zone | Herbaceous |
| Riparian Zone Notes | Wild carrot, grasses, mint, yellow flowers, few mature trees - willows Downstream small wooded area: ash, box elder, garlic mustard |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Few minnows, frog, macros including a stone fly, macrophytes |
| Infrastructure | Culverts, Roads, Structures |
| Infrastructure Notes | Cattle crossing in middle of reach, culvert at upstream and downstream ends of reach |
| Environmental Impacts | Wetlands, Tree removal, Soil conditions |
| Environmental Impacts Notes | Wetlands impacted - could be restored. Could improve shading. Tree removal of Soil Conservation Department trees... could replace? |
| Cultural/Historical Impacts | None |
| Materials for Reuse | Trees |

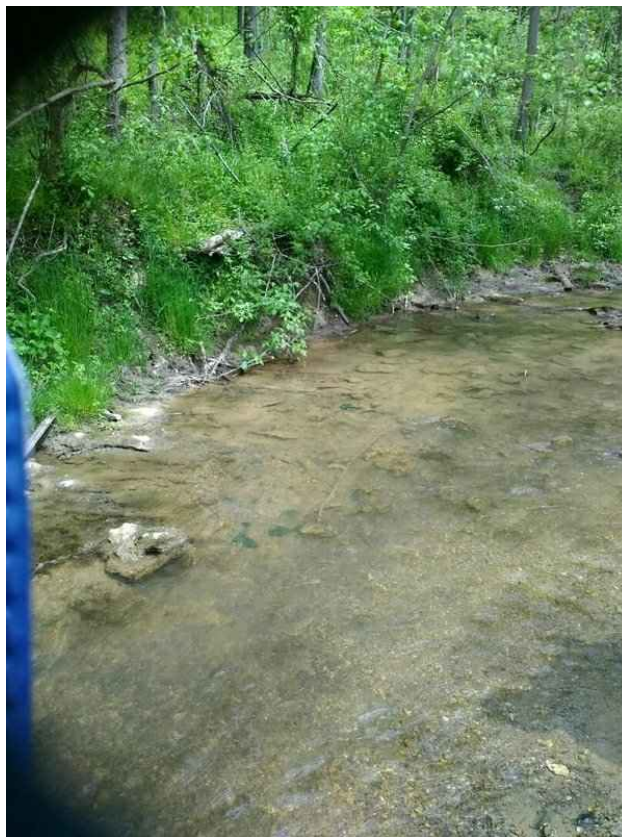
Restoration Ideas

Floodplain re-connection
Wetland restoration
Oxbow enhancements
Localized grading and bank stabilization
Potential redesign of cattle passage

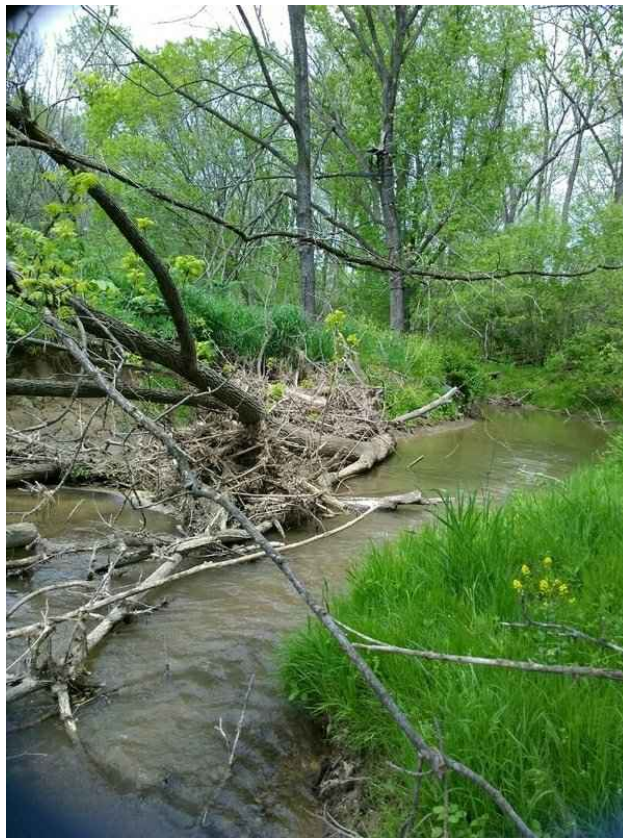
38-Stream, 13117 BUNKER HILL RD, -77.211731, 39.563401

| | |
|------------|---|
| Created | 2018-04-18 20:58:47 UTC by Akta Patel |
| Updated | 2018-05-11 18:17:43 UTC by Akta Patel |
| Location | 39.563401, -77.211731 |
| FulcrumID | 38-Stream |
| PIN | 45465 |
| TAX_ACCT | 1117363972 |
| Address | 13117 BUNKER HILL RD |
| Comments | Site Walk....Reach divided by roadways; other reaches identified for site walk up and downstream, could combine |
| XCOORD | -77.211731 |
| YCOORD | 39.563401 |
| Stream_Len | 2,074.58 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=363972 |

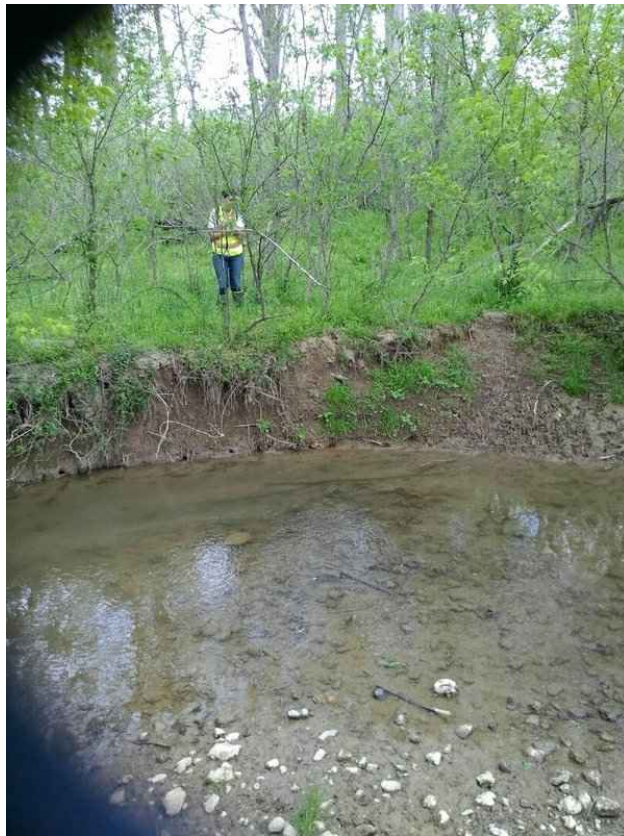
Photos



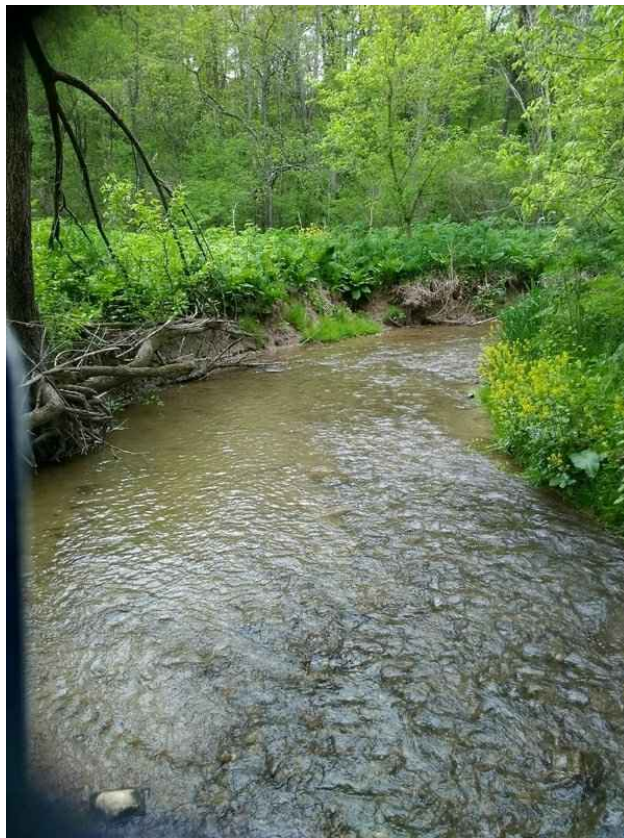


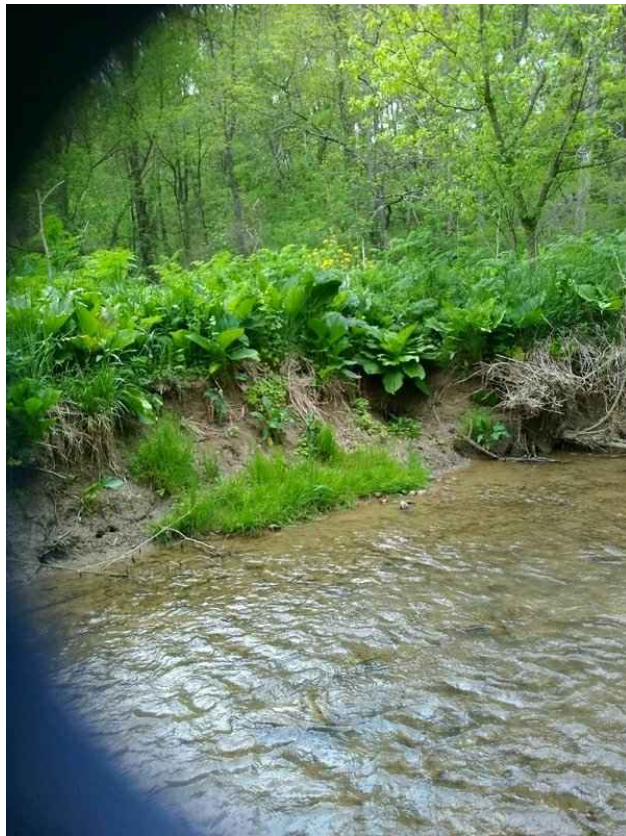














| | |
|-------------------------------|---|
| Reach Setting | U/s property boundary. Downstream, culvert at Bunker Hill Rd. Predominantly wooded area except D/S right side and u/s left side |
| Dominant Bed Material | Silt/clay |
| Secondary Bed Material | Gravel, Cobble |
| Bed Material Notes | Small cobble, large gravel, sand matrix |
| Dominant Bed Form Morphology | Plane-bed |
| Secondary Bed Form Morphology | minor riffle and pool areas |
| Bed Form Morphology Notes | Minor riffle and pool like features, and steeper slopes |
| Vertical Confinement | Culverts |
| Vertical Confinement Notes | Culvert downstream extent , woody debris present at entrance |
| Vertical Adjustments | Side bars, small side bars |
| Vertical Adjustments Notes | Some, small side bars |
| Dominant Plan form geometry | Single Thread Meandering |

| | |
|------------------------------|--|
| Secondary Plan form geometry | Single Thread Straight |
| Plan Form Geometry Notes | Lower Downstream section relatively straight (~300'), upstream mainly meandering form (~1300) chance of oxbow formation at 2 points. |
| Floodplain/Terraces | Floodplains (L/R), Terraces (abandoned floodplain) |
| Floodplains/Terraces Notes | R, some floodplain. L, terrace |
| Lateral confinement | none |
| Lateral adjustments | Bank erosion, Meander migration, Undercut trees |
| Lateral Adjustments Notes | Bank erosion on outer bends in meandering sections. Up to 5 feet high. Undercut trees observed throughout. a few small side bars |
| Bank Erosion | Headlights, piping points throughout. Rotational failure noted on outer bends in meandering sections |

Bank Characteristics

| | |
|------------------------------|---|
| Dominant Bank Materials | Silt/Clay |
| Dominant Bank Material Notes | Sand in the matrix |
| Secondary Bank Materials | Gravel |
| Average Bank Height | 3-5 ft on right bank, 4-6 ft on left bank |

In-Stream Habitat Resources or Concerns

| | |
|-------------------------------------|--|
| Baseflow Depth | Adequate |
| Fish Passage | No impediment |
| Shading | Good |
| Woddy Debris | Present - overhanging tree roots with pools beneath |
| Floodplain Connectivity | 3 - Incised with large floodplain area |
| Lateral Stability of Stream Channel | 2 - Moderately stable |
| Riparian Zone Notes | Invasive present, stinging nettle, garlic mustard, broadleaf dock, multiflora rose, maples, honey locusts, ash trees. 25% shrub, 50% woody |
| Percent Woody | 50 % |
| Canopy Percent | 75-100% |
| Aquatic Habitat Notes | Minor riffle features throughout. Vaudeville seems adequate. Shaded throughout. Lwd present. |
| Infrastructure | Culverts, Roads |
| Infrastructure Notes | D/S culvert at Bunker Hill Rd, 4 60-inch CMP, with bottom half perimeter concrete, HW & WW, guide rail on top. Temporary crossing at midsection of reach: 2 24-inch wide longevity flat top, small access road at crossing stream locations |
| Environmental Impacts | Riparian zone, Tree removal, Shading |
| Cultural/Historical Impacts | None |
| Materials for Reuse | Trees |
| Restoration Ideas | Grading to floodplain, fix erosion at outer banks. Connect highly meandering sections with active outer bank meander erosion (i.e. stream separated ~5 ft apart in one location). Add riparian buffers at open area. Remove invasives. |

42-Stream, KEYMAR RD, -77.240305, 39.560851 ft

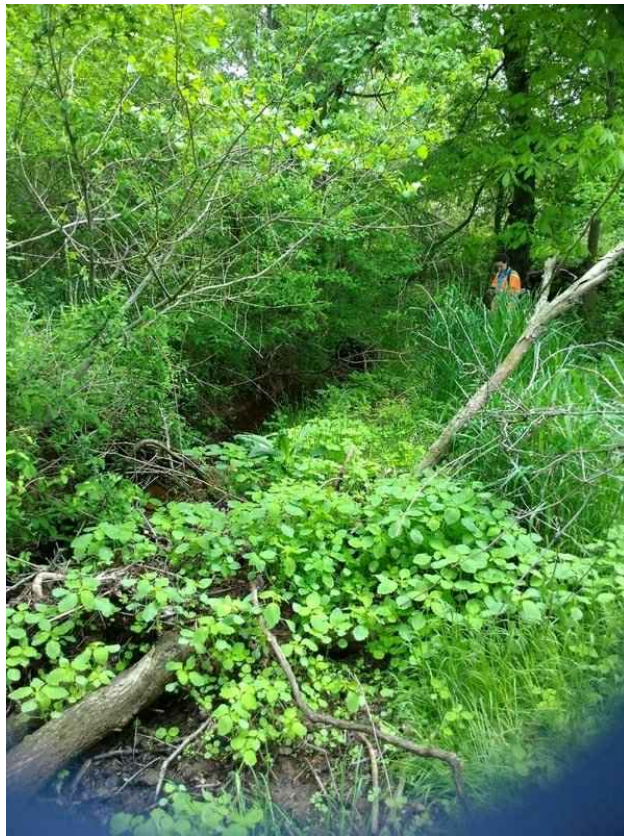
| | |
|------------|---|
| Created | 2018-04-18 20:58:47 UTC by Akta Patel |
| Updated | 2018-05-14 17:34:25 UTC by Akta Patel |
| Location | 39.560851, -77.240305 |
| FulcrumID | 42-Stream |
| PIN | 72989 |
| TAX_ACCT | 1117367498 |
| Address | KEYMAR RD |
| Comments | Site Walk.... |
| XCOORD | -77.240305 |
| YCOORD | 39.560851 ft |
| Stream_Len | 352.73 |
| Restoratio | Streamlined |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=358235 |

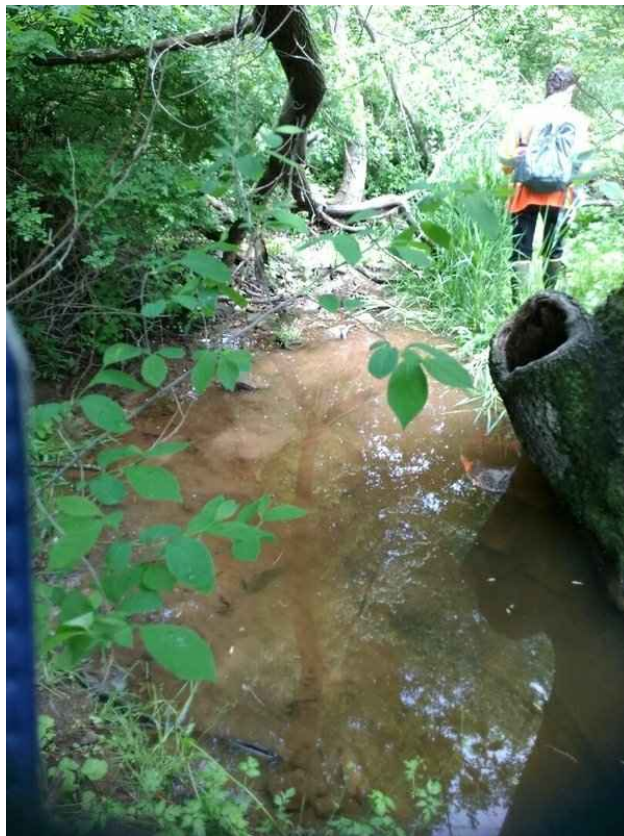
Photos











Reach Setting

U/s wooded edge of field. Low point of valley. L- meadow field. R- active ag use, livestock present.

Dominant Bed Material

Gravel, Cobble

| | |
|------------------------------|-------------------------------------|
| Secondary Bed Material | Silt/clay |
| Bed Material Notes | Gravels secondary |
| Dominant Bed Form Morphology | Pool-riffle |
| Vertical Confinement | none |
| Vertical Adjustments | Plunge pools, Side bars |
| Dominant Plan form geometry | Single Thread Meandering |
| Secondary Plan form geometry | Single Thread Straight, u/s segment |
| Floodplain/Terraces | confined. |
| Floodplains/Terraces Notes | Infused and building back up |
| Lateral adjustments | Bank erosion, Undercut trees |
| Bank Erosion | Moderate |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 5-6 |
| Average Bank Height | 3-4 |
| Min Bank Height | 2 |

In-Stream Habitat Resources or Concerns

| | |
|-------------------------------------|--|
| Baseflow Depth | Adequate |
| Fish Passage | No barriers note |
| Shading | 75-100% |
| Habitat/flow diversity | High end |
| Woody Debris | Present throughout |
| Overhanging banks | Present throughout 75-100% |
| Riffle embeddedness | Moderate |
| Floodplain Connectivity | 2, infused with limited floodplain |
| Lateral Stability of Stream Channel | Moderate |
| Riparian Zone Notes | Dominate native, maples, oak, mayapple, common reed, honeysuckle.. Invasives, multiflora, garlic mustard, skunk cabbage, thistle. Maturedtrees present throughout. 75-100 herbaceous, 50% shrubs |
| Percent Woody | 75-100% |
| Percent Herbaceous | 75-100% |
| Percent Invasive | 50% |
| Canopy Percent | 75-100% |
| Aquatic Habitat Notes | Frogs present, cadisfly, macros present |
| Environmental Impacts | Wetlands, Riparian zone, Tree removal, Shading, Soil conditions |
| Materials for Reuse | Trees |
| Restoration Ideas | Flood plain connectivity, Large woody debris. Gully stabilization |

49-Stream, 12404 SIMPSONS MILL RD, -77.226512, 39.577732

| | |
|------------|---|
| Created | 2018-04-18 20:58:47 UTC by Akta Patel |
| Updated | 2018-05-14 14:39:54 UTC by Akta Patel |
| Location | 39.577732, -77.226512 |
| FulcrumID | 49-Stream |
| PIN | 49885 |
| TAX_ACCT | 1117361511 |
| Address | 12404 SIMPSONS MILL RD |
| Comments | Site Walk.... |
| XCOORD | -77.226512 |
| YCOORD | 39.577732 |
| Stream_Len | 1,008.41 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=361511 |

Photos























| | |
|-------------------------------|--|
| Reach Setting | Pasture for cows, upstream is concrete bridge, downstream is property line with electric fence across stream. Bounded by electrical fence in riparian buffer zone. |
| Dominant Bed Material | Bedrock |
| Secondary Bed Material | Gravel |
| Bed Material Notes | Cobbles throughout, matrix of silt/clay |
| Dominant Bed Form Morphology | Pool-riffle |
| Secondary Bed Form Morphology | Plane-bed |
| Bed Form Morphology Notes | Some pools poorly defined |
| Vertical Confinement | Bedrock, Concrete |
| Vertical Confinement Notes | Concrete bridge in road, bedrock formed riffles and bed in few pool/transition areas |
| Vertical Adjustments | Side bars, Mid-channel bars |
| Vertical Adjustments Notes | Gravel bars |
| Dominant Plan form geometry | Single Thread Meandering |

| | |
|--|--|
| Floodplain/Terraces | Floodplains (L/R) |
| Floodplains/Terraces Notes | Left floodplain throughout, right floodplain confined by valley slope mid-reach |
| Lateral confinement | bedrock outcroppings |
| Lateral Confinement Notes | Mid-reach, right bank |
| Lateral adjustments | Bank erosion, Undercut trees, Point bar development |
| Lateral Adjustments Notes | Few undercut trees, bank erosion more severe on outer meander bends, present on both sides of stream, some gravel point bars forming, most vegetated |
| Bank Erosion | Severe. Both banks. Toe scour. |
| Local disturbance contributing to bank erosion | Heavy access by cattle - multiple crossings. Reported upstream tree removal. |

Bank Characteristics

| | |
|-------------------------------|--|
| Dominant Bank Materials | Silt/Clay |
| Secondary Bank Materials | Bedrock |
| Secondary Bank Material Notes | Present at toe in many locations, but not throughout |
| Max Bank Height | 10 |
| Average Bank Height | 5 |
| Min Bank Height | 1-2 |

In-Stream Habitat Resources or Concerns

| | |
|--|---|
| In-Stream Habitat Resources and Concerns | Shading, LWD |
| Baseflow Depth | Not a problem |
| Fish Passage | Not a problem |
| Shading | Low to moderate ~ 25% |
| Habitat/flow diversity | Good - riffles, pools, some eddys |
| Woddy Debris | Little present in stream - some deposited from floods |
| Overhanging banks | Few |
| Riffle embeddedness | Low |
| Floodplain Connectivity | 2 - right side has smaller floodplain /generally less access, stream incised |
| Lateral Stability of Stream Channel | 3 - unstable |
| Riparian Zone | Mature/specimen trees, Shrubs, Herbaceous |
| Riparian Zone Notes | Common reed, typha, multiflora, buttercups, clover, grasses, stinging nettle, oaks, Chinese willow, |
| Percent Woody | 25 |
| Percent Herbaceous | 100 |
| Percent Invasive | 25-50 |
| Canopy Percent | 25 |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Minnows, tadpoles/frogs, group 1 macros - leeches, caddisfly, mayfly. Adequate baseflow depth |
| Infrastructure | Bridges |
| Infrastructure Notes | Concrete bridge, electrical fencing |
| Environmental Impacts | Wetlands, Tree removal, Shading, Soil conditions |
| Environmental Impacts Notes | Some wetland plants at riffles - constricted flow areas |
| Cultural/Historical Impacts | None |
| Materials for Reuse | Trees/wd |

55-Stream, 21757 KEYMAR RD, -77.243644, 39.580968

| | |
|------------|---|
| Created | 2018-04-18 20:58:48 UTC by Akta Patel |
| Updated | 2018-05-10 20:32:51 UTC by Akta Patel |
| Location | 39.580968, -77.243644 |
| FulcrumID | 55-Stream |
| PIN | 51855 |
| TAX_ACCT | 1117366807 |
| Address | 21757 KEYMAR RD |
| Comments | Site Walk.... |
| XCOORD | -77.243644 |
| YCOORD | 39.580968 |
| Stream_Len | 2,091.71 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=358472 |

Photos











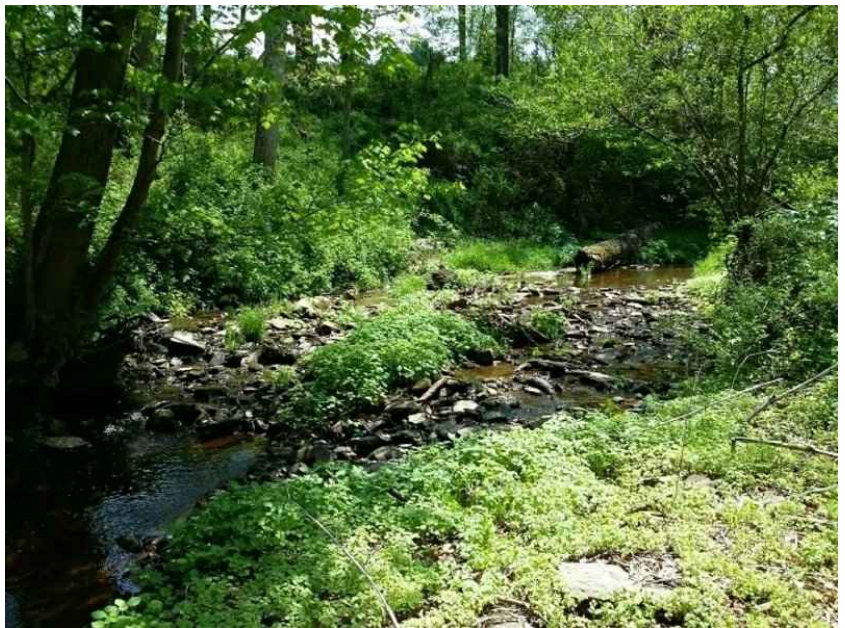
















| | |
|------------------------------|---|
| Reach Setting | Upstream boundary is fence on property line, downstream is the keymar rd bridge. Horse farm pasture along much of right side of stream, buffered by short valley slope. Left side is valley slope as well |
| Dominant Bed Material | Sand, Gravel |
| Secondary Bed Material | Cobble, Bedrock |
| Bed Material Notes | Sand in pools, gravels in riffles and transition areas. Cobbles in riffles. Bedrock formed small riffles. |
| Dominant Bed Form Morphology | Pool-riffle |
| Vertical Confinement | Bedrock |
| Vertical Confinement Notes | Bedrock formed some of the riffles and little cascades |
| Vertical Adjustments | Point bars, Side bars, Mid-channel bars |
| Vertical Adjustments Notes | Some bars were sparsely vegetated. Bars were mostly made of cobbles and large gravels |
| Dominant Plan form geometry | Single Thread Meandering |

| | |
|----------------------------|--|
| Plan Form Geometry Notes | Some preferential flow paths at higher flows visible around deposited large gravels and cobbles |
| Floodplain/Terraces | Floodplains (L/R), Terraces (abandoned floodplain) |
| Floodplains/Terraces Notes | Very limited floodplain area - valley slopes down to top of bank in most locations. Downstream portion of reach floodplains are restricted by properties |
| Lateral confinement | bedrock |
| Lateral Confinement Notes | Bedrock outcroppings along both sides - not dominant |
| Lateral adjustments | Bank erosion, Meander migration, Undercut trees, Point bar development |
| Lateral Adjustments Notes | Eroding banks somewhat protected by vegetation Side bar development |
| Bank Erosion | Moderate |

Bank Characteristics

| | |
|------------------------------|---|
| Dominant Bank Materials | Silt/Clay |
| Dominant Bank Material Notes | Especially on cut banks. Bedrock and large cobbles/boulders along banks in some areas |
| Max Bank Height | 7 ft |
| Average Bank Height | 3-5 ft |
| Min Bank Height | 2 ft |

In-Stream Habitat Resources or Concerns

| | |
|--|---|
| In-Stream Habitat Resources and Concerns | Shading, Riffle embeddedness |
| Baseflow Depth | No issue |
| Fish Passage | No real blockages but some woody debris restricts flow |
| Shading | Moderate - shaded banks, woody debris, trees |
| Habitat/flow diversity | Fairly good - pool-riffle, cobbles, gravels, woody debris, overhanging banks |
| Woody Debris | In channel and floodplain: fallen trees, rootwads, branches |
| Overhanging banks | Some |
| Riffle embeddedness | Moderate - more where macrophytes bloomed on cobbles |
| Floodplain Connectivity | 2 - incised with limited floodplain area |
| Lateral Stability of Stream Channel | 3 - Unstable |
| Riparian Zone | Dominant native and invasive species, Mature/specimen trees, Shrubs, Herbaceous |
| Riparian Zone Notes | Tulip poplar, sycamore, ash - mature dominant Spicebush Jewelweed, queen annes lace (?) |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Frogs, minnows/fish, macros, macrophytes, few grasses growing in channel |
| Infrastructure | Bridges, Culverts, Roads, Embankments |
| Infrastructure Notes | Keymar Rd bridge at end of reach with 6 ft tall metal and concrete encased bottom. Some sediment, some channel constriction Culvert from property mid upstream end of reach on left bank Drain pipe on right bank empties directly into stream Farmer crosses channel at cobble riffle - stable |
| Environmental Impacts | Wetlands, Riparian zone, Tree removal, Shading, Soil conditions, Steep slopes |
| Environmental Impacts Notes | Steep slopes may be challenging to work on |
| Cultural/Historical Impacts | None |

| | |
|---------------------|--|
| Materials for Reuse | <p>Trees for woody debris</p> <p>Mid and side channel large cobble deposits forming vegetated bars (some gravels mixed in)</p> |
| Restoration Ideas | <p>Limited space</p> <p>May just need a localized solution - bank stabilization, some bioengineering</p> |

78-Stream, 11538 HANDBOARD RD, -77.226882, 39.551774

| | |
|------------|---|
| Created | 2018-04-18 20:58:50 UTC by Akta Patel |
| Updated | 2018-07-07 05:12:58 UTC by Akta Patel |
| Location | 39.551774, -77.226882 |
| FulcrumID | 78-Stream |
| PIN | 49592 |
| TAX_ACCT | 1117365045 |
| Address | 11538 HANDBOARD RD |
| Comments | Site walk. Recommended by Anne Bradley - owns many farms.... |
| XCOORD | -77.226882 |
| YCOORD | 39.551774 |
| Stream_Len | 591.26 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=365045 |

Photos

























































| | |
|------------------------------|--|
| Reach Setting | Runs parallel to Handboard road, through scattered wooded, wetland buffer, and groundwater seeps. U/s and d/s are property lines at edges of fields. Wide gently sloping valley, headwaters are on next property upstream. |
| Dominant Bed Material | Silt/clay, Gravel |
| Bed Material Notes | Silt/clay dominant in u/s portion, d/s of small headcut, small gravels are dominant. |
| Dominant Bed Form Morphology | Pool-riffle |
| Bed Form Morphology Notes | stream-wetland complex in upstream section with spring seeps |
| Vertical Confinement | Culverts, vehicle crossing |
| Vertical Confinement Notes | Culvert conveying stream under driveway |
| Vertical Adjustments | Headcuts, Side bars |
| Vertical Adjustments Notes | Small headcut in clay segment of bed (near upstream end of reach), gravel side beats in unstable area d/s of culvert and vehicle crossings |
| Dominant Plan form geometry | Single Thread Meandering |
| Floodplain/Terraces | Floodplains (L/R) |

| | |
|--|---|
| Floodplains/Terraces Notes | Collapsed floodplain just d/s of culvert, otherwise floodplain is wide and grassed except for eroded spring seep areas. |
| Lateral Confinement Notes | Some floodplain confinement - utility pole |
| Lateral Adjustments Notes | None |
| Bank Erosion | Little to none |
| Local disturbance contributing to bank erosion | U/s land use - clearing, stream was left undisturbed for years, current owner is cutting back riparian zone (but leaving a buffer of mostly herbaceous) |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 4 |
| Average Bank Height | 2 |
| Min Bank Height | 1 |

In-Stream Habitat Resources or Concerns

| | |
|-------------------------------------|---|
| Baseflow Depth | No concern |
| Fish Passage | Culvert and vehicle crossing/ford is an impediment |
| Shading | Moderate... some scattered trees mid-reach, more shade d/s |
| Habitat/flow diversity | Low to okay - few pools, some riffles, wetland seeps bring in groundwater |
| Woddy Debris | Few |
| Overhanging banks | None |
| Riffle embeddedness | Low |
| Floodplain Connectivity | Connected |
| Lateral Stability of Stream Channel | Stable |
| Riparian Zone | Dominant native and invasive species, Shrubs, Herbaceous |
| Riparian Zone Notes | Facultative wetland plants, grasses, thorny woody shrubs (raspberry, etc) |
| Percent Woody | 0-25 |
| Percent Herbaceous | 75-100 |
| Percent Invasive | 0-25 |
| Canopy Percent | 0-25 |
| Aquatic Habitat Notes | Some aquatic vegetation at channel edge. Frogs, some macros. Owner noticed birds and amphibians |
| Infrastructure | Structures, Nonconflicting utilities) |
| Infrastructure Notes | Electrical pole on left side of bank, grounds on right side. Lightly stabilized vehicle crossing mid-reach. Culvert under driveway constricts channel. Spring house on right bank mid reach. |
| Environmental Impacts | Wetlands, Riparian zone, Soil conditions |
| Environmental Impacts Notes | Muddy soil, wetlands and spring seeps |
| Cultural/Historical Impacts | Historical house - may want to consider historical stream/wetland form. Spring house on right bank mid reach |
| Materials for Reuse | None |
| Restoration Ideas | Wetland restoration and reconnection with channel. Stabilize and potentially relocate vehicle crossing. Invasive management and riparian plantings. Owner prefers park-like setting. Grade floodplain at road culvert outlet to improve drainage. |

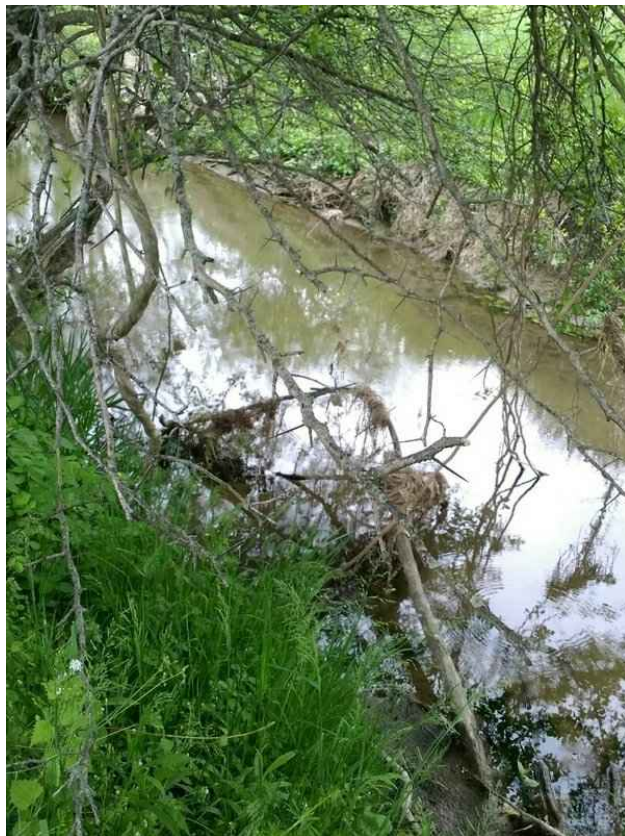
85-Stream, 11330B CLEMSONVILLE RD, -77.181106, 39.548284

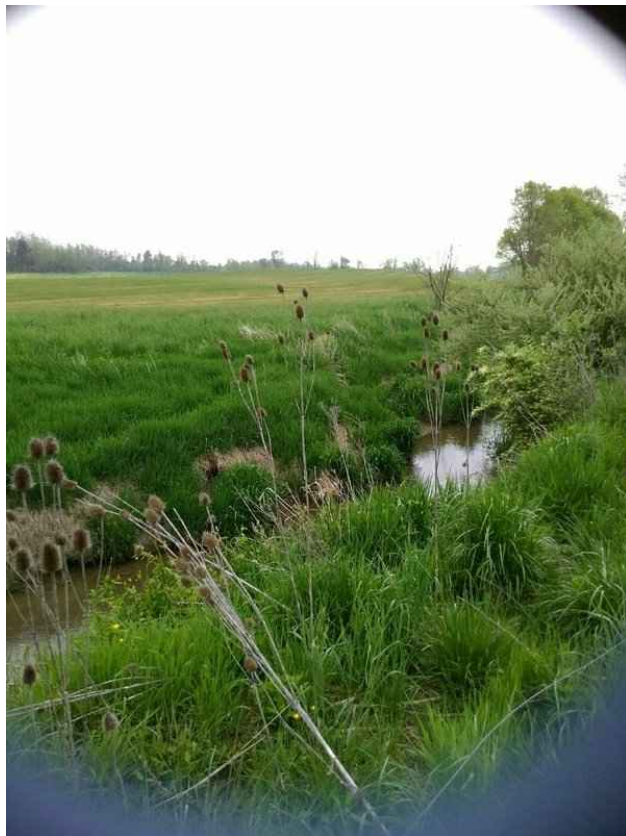
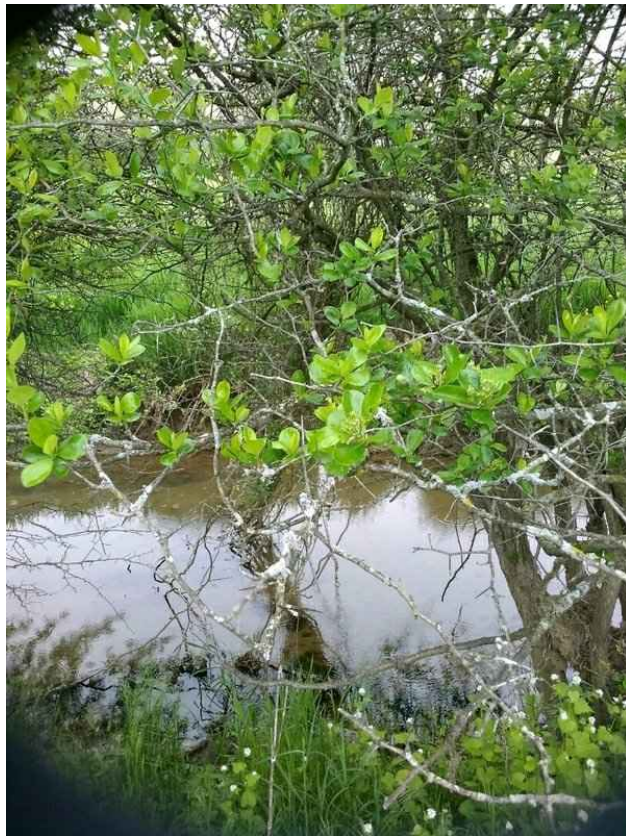
| | |
|------------|---|
| Created | 2018-04-18 20:58:50 UTC by Akta Patel |
| Updated | 2018-05-11 18:21:08 UTC by Akta Patel |
| Location | 39.548284, -77.181106 |
| FulcrumID | 85-Stream |
| PIN | 50895 |
| TAX_ACCT | 1117364103 |
| Address | 11330B CLEMSONVILLE RD |
| Comments | Site Walk. Recommended by Anne Bradley - Daughter has now - parents passed away.... |
| XCOORD | -77.181106 |
| YCOORD | 39.548284 |
| Stream_Len | 1,628.66 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=364103 |

Photos







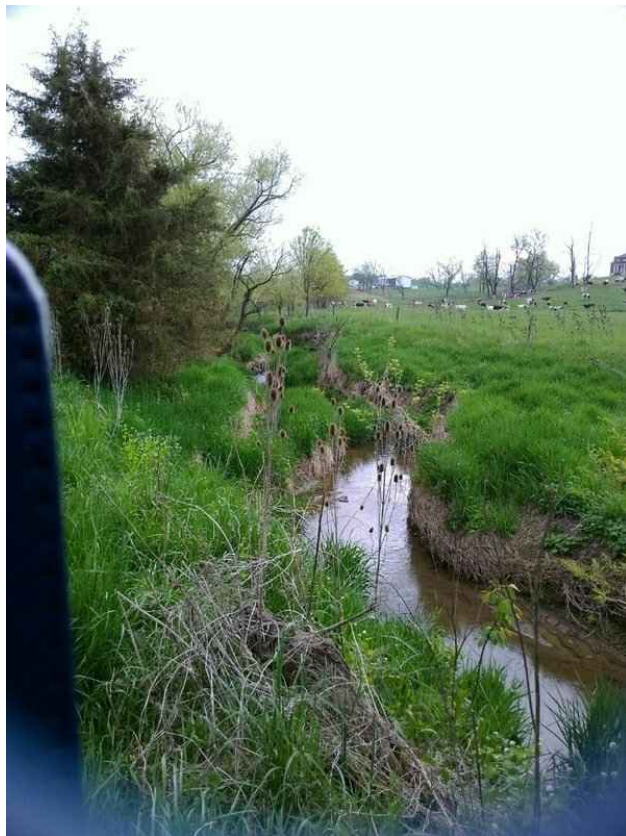


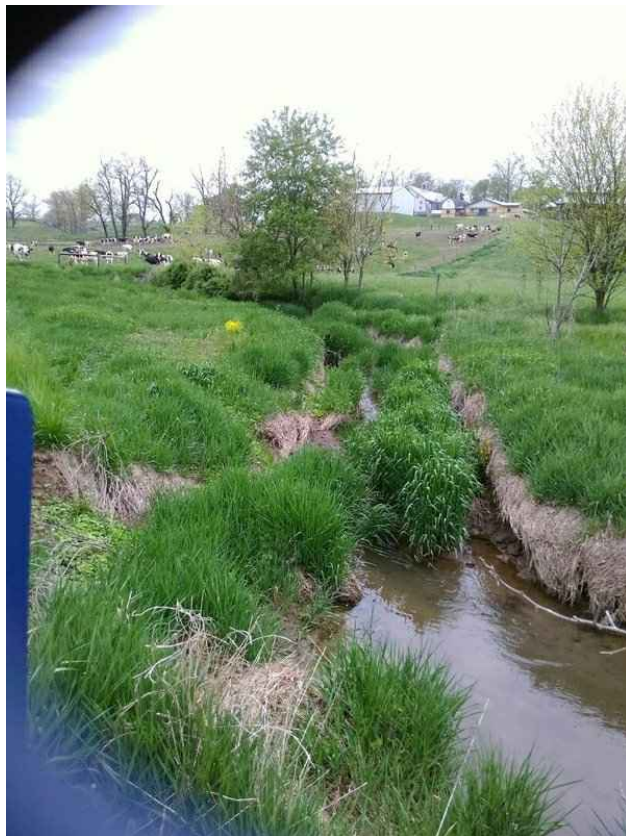
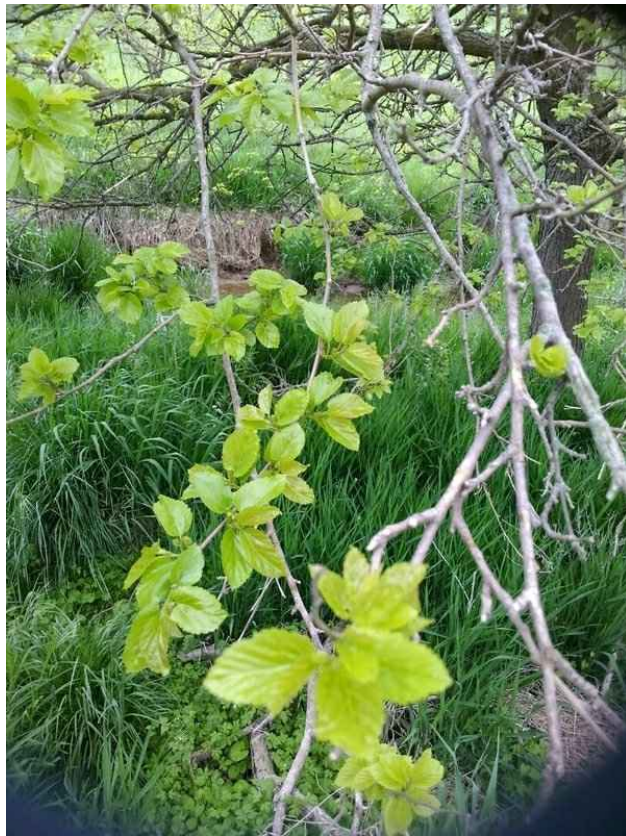














| | |
|--|---|
| Reach Setting | Ds, at road crossing. Us, property boundary. L, LIVESTOCK, 5-10ft fenced from bank. R, Agricultural field, no |
| Dominant Bed Material | Silt/clay |
| Secondary Bed Material | Gravel, large gravel, cobble on streamside |
| Dominant Bed Form Morphology | Plane-bed, no defined step pool or cascade |
| Vertical Confinement | Culverts, upstream side but not perched |
| Vertical Adjustments | alluvial islands in mid sections, vegetation seen throughout the reach |
| Dominant Plan form geometry | Single Thread Meandering |
| Secondary Plan form geometry | Single Thread Straight, Multiple Thread Braided, at locations around alluvial islands |
| Plan Form Geometry Notes | Straight closer upstream, meandering downstream |
| Floodplain/Terraces | Floodplains (L/R), Terraces (abandoned floodplain), FP observed on both sides. terraces 10-15 ft wide. |
| Lateral confinement | Riprap, electric pole protection. observed 15ft from bank |
| Lateral adjustments | Bank erosion, severe signs of bank erosion 100 ft downst from culvert |
| Lateral Adjustments Notes | Dead veg on extent of erosion. |
| Bank Erosion | Toe scour present, minor piping erosion visible |
| Local disturbance contributing to bank erosion | Little to non woody riparian buffer present on left bank, where livestock is present |
| Local Instability Stream Bank Failure | Piping, head cut, see photos |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 5-10 |
| Average Bank Height | 7 |
| Min Bank Height | 5 |

In-Stream Habitat Resources or Concerns

| | |
|--|--|
| In-Stream Habitat Resources and Concerns | Shading, Overhanging banks |
| Baseflow Depth | Low |
| Shading | 25% |
| Habitat/flow diversity | Small riffles present throughout |
| Woddy Debris | Present at one location |
| Overhanging banks | Present |
| Floodplain Connectivity | Incised with limited floodplane |
| Lateral Stability of Stream Channel | Banks are actively eroding and will continue to erode. |
| Riparian Zone | Canopy coverage |
| Riparian Zone Notes | Sparsely distributed trees, mostly clustered at most downstream section. Some trees on left bank upstream. |
| Percent Woody | 25% |
| Percent Herbaceous | 75% |
| Percent Invasive | 50% phragmites on mid channel alluvial islands ? And floodplain |
| Canopy Percent | 25--50% |
| Aquatic Habitat | adequate depth for fish ... fish passage possible. |
| Infrastructure | Culverts, Roads, Nonconflicting utilities), electric lines |
| Infrastructure Notes | **See field notes, 2 culverts at 4ft wide, 5 ft wide with concrete bottom. Concrete headwalls. Plastic 36 in sdpe drain pipe discharging near left wing wall downstream side of culvert. Mid section pvc pipe drain pipe |
| Environmental Impacts | Wetlands, Soil conditions, steep bank slopes at eroded areas . absence of shading |
| Environmental Impacts Notes | Wetland protection area on upstream side of culvert (outside of assessment reach) |
| Cultural/Historical Impacts | Livestock/dairy farm on left bank |
| Materials for Reuse | N/a limited trees |
| Restoration Ideas | Bank stabilization, cleaning on mid alluvial island. Riparian planting. Forming defined channel section. Create more riffles and pools to promote habitat |

87-Stream, 11601 KEYMAR RD, -77.243317, 39.554696

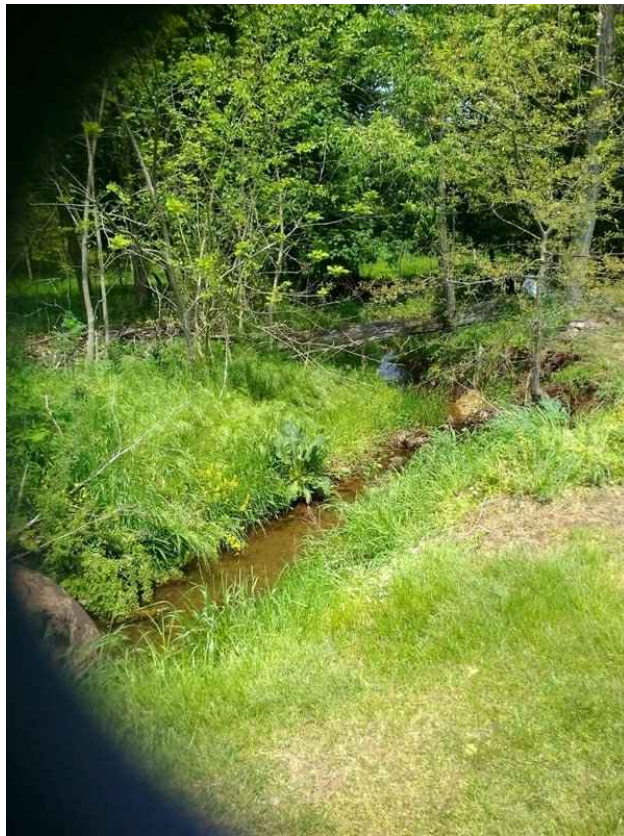
| | |
|------------|---|
| Created | 2018-04-18 20:58:50 UTC by Akta Patel |
| Updated | 2018-05-14 18:38:56 UTC by Akta Patel |
| Location | 39.554696, -77.243317 |
| FulcrumID | 87-Stream |
| PIN | 50587 |
| TAX_ACCT | 1117358421 |
| Address | 11601 KEYMAR RD |
| Comments | Site Walk. Recommended by Anne Bradley - yurt owner....Upstream end of reach skirts ag pond - may want to start restoration further downstream |
| XCOORD | -77.243317 |
| YCOORD | 39.554696 |
| Stream_Len | 743.46 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=358421 |

Photos























| | |
|--|--|
| Reach Setting | U/s road culvert, d/s tree buffer on property line. Riparian buffer bounded by mowed area. Building 20ft from right bank |
| Dominant Bed Material | Gravel |
| Secondary Bed Material | Silt/clay |
| Bed Material Notes | Cobble also highly prevalent |
| Dominant Bed Form Morphology | Plane-bed |
| Bed Form Morphology Notes | Pools present, no well defined riffles |
| Vertical Confinement | Culverts, rip rap swale trib into creek, drainage from fields |
| Vertical Confinement Notes | U/s metal culvert, two hdpe culverts mid-reach |
| Vertical Adjustments | none |
| Vertical Adjustments Notes | All bar-like formations vegetated |
| Dominant Plan form geometry | Single Thread Straight |
| Secondary Plan form geometry | Single Thread Meandering |
| Plan Form Geometry Notes | U/s straight, few meanders d/s |
| Floodplains/Terraces Notes | Fairly confined, not much floodplain |
| Lateral confinement | none |
| Lateral adjustments | Bank erosion, Undercut trees |
| Lateral Adjustments Notes | Undercut trees present |
| Bank Erosion | Moderate bank erosion |
| Local disturbance contributing to bank erosion | Drainage pipes from downspouts directed into creek - protruding from bank Grassed over pipe stream crossings |


Bank Characteristics

| | |
|--------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Secondary Bank Materials | Cobble |
| Max Bank Height | 5 |
| Average Bank Height | 3 |
| Min Bank Height | 1 |

In-Stream Habitat Resources or Concerns

| | |
|-------------------------------------|---|
| Baseflow Depth | Adequate |
| Fish Passage | U/s culvert is a barrier |
| Shading | 50-75% |
| Habitat/flow diversity | More diverse downstream than u/s. Some pools, some gravel |
| Woddy Debris | Smaller sticks and branches, more prevalent d/s. A section of u/s had no woody vegetation |
| Overhanging banks | Present 75% - not as much u/s |
| Riffle embeddedness | Moderate to severe |
| Floodplain Connectivity | 2 |
| Lateral Stability of Stream Channel | 3 - unstable |
| Riparian Zone | Dominant native and invasive species, Mature/specimen trees, Shrubs, Herbaceous |
| Riparian Zone Notes | Multiflora, maples, box elder, ash, lambsquarter, wild garlic, broadleaf dock, few cattails |
| Percent Woody | 75-100% |
| Percent Herbaceous | 75-100% |
| Percent Invasive | 50% |
| Canopy Percent | 75-100% |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Macrophytes, frogs, lwd throughout, some pools |
| Infrastructure | Culverts, Nonconflicting utilities) |
| Infrastructure Notes | 2 culverts mid-reach, one of u/s |
| Environmental Impacts | Wetlands, Riparian zone, Tree removal, Shading, Soil conditions |
| Cultural/Historical Impacts | None |
| Materials for Reuse | Trees, tree tubes, concrete slabs, rip rap |
| Restoration Ideas | Bank grading & stabilization, sand filter for rooftop disconnection, hard armor outer bends, culvert/pipe upgrade |

94-Stream, 12686-12672 MD-194, Keymar, MD, -77.257064, 39.580878

| | |
|------------|---|
| Created | 2018-04-18 20:58:51 UTC by Akta Patel |
| Updated | 2018-05-10 18:26:11 UTC by Akta Patel |
| Location | 39.580878, -77.257064 |
| FulcrumID | 94-Stream |
| PIN | 85393 |
| TAX_ACCT | 0 |
| Address | 12686-12672 MD-194, Keymar, MD |
| Comments | Site Walk [Portions of] this will be a tough stream with the amount of building and houses so close to the stream.....Combined reaches into one for site walk. Included section around ag pond for evaluation |
| XCOORD | -77.257064 |
| YCOORD | 39.580878 |
| Stream_Len | 3,169.68 |
| Restoratio | Stream |
| Photos |  |

















| | |
|-------------------------------|---|
| Reach Setting | Bounded by Good Intent Rd and Loyd's (property owner's) driveway Parallel to Woodsboro Pike and railroad tracks on other side. Broad valley with floodplain on one or both sides. |
| Dominant Bed Material | Silt/clay, Gravel |
| Secondary Bed Material | Sand, Cobble |
| Bed Material Notes | Silt, clay, and gravels dominant with sand and cobble present |
| Dominant Bed Form Morphology | Pool-riffle |
| Secondary Bed Form Morphology | Plane-bed |
| Bed Form Morphology Notes | Small pool riffle dimensions relative to channel |
| Vertical Confinement Notes | None |
| Vertical Adjustments | Headcuts, Plunge pools, Point bars, Side bars |
| Vertical Adjustments Notes | 3 head cuts coincidental with woody debris, plunge pool downstream of one |
| Dominant Plan form geometry | Single Thread Meandering |

| | |
|----------------------------|--|
| Floodplain/Terraces | Floodplains (L/R), Terraces (abandoned floodplain) |
| Floodplains/Terraces Notes | Floodplain width varies but is always present - 80% of the reach has the floodplain on both sides, 20% of the reach has the floodplain on the left and a sloping valley on the right |
| Lateral confinement | None |
| Lateral Confinement Notes | Occasional in-channel anthropogenic debris near the house provide some minor confinement |
| Lateral adjustments | Bank erosion, Bank retreat, Meander migration, Undercut trees, Point bar development |
| Bank Erosion | Mild to severe bank erosion, moderate is typical |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
|-------------------------|-----------|

In-Stream Habitat Resources or Concerns

| | |
|--|---|
| In-Stream Habitat Resources and Concerns | Habitat/flow diversity |
| Baseflow Depth | Not a problem |
| Fish Passage | Not a problem |
| Shading | Present |
| Habitat/flow diversity | Low flow/habitat diversity |
| Woody Debris | Present |
| Overhanging banks | None |
| Riffle embeddedness | Low to moderate |
| Floodplain Connectivity | 1 - Connected. But channel has varying degrees of incision and may not have access throughout the entire reach |
| Lateral Stability of Stream Channel | 2 - Moderately stable |
| Riparian Zone | Canopy coverage, Understory, Mature/specimen trees, Shrubs, Herbaceous |
| Riparian Zone Notes | Spans width of valley Mature trees present, understory trees, few shrubs Maples, multi-flora, raspberry, lots of herbaceous ground cover Evidence of deer browse Site of riparian planting project [tree tubes] Stream encroachment by lawn around residence |
| Canopy Percent | 25-50% |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Bullfrogs, minnows, snakes |
| Infrastructure | Culverts, Structures |
| Infrastructure Notes | Old concrete crossing that the stream eroded around Culverts with gullies that empty into stream |
| Environmental Impacts | Wetlands, Riparian zone, Tree removal, Shading, Soil conditions |
| Environmental Impacts Notes | Wetlands adjacent to channel near driveway |
| Cultural/Historical Impacts | None |
| Materials for Reuse | Trees for woody debris |
| Restoration Ideas | Localized floodplain re-connection Localized re-grading Bank stabilization and bioengineering Bioretention to treat roadway runoff before it enters the stream |

97-Stream, WOODSBORO PIKE, -77.24486, 39.588314

| | |
|------------|---|
| Created | 2018-04-18 20:58:51 UTC by Akta Patel |
| Updated | 2018-05-10 20:44:26 UTC by Akta Patel |
| Location | 39.588314, -77.24486 |
| FulcrumID | 97-Stream |
| PIN | 49181 |
| TAX_ACCT | 1117358227 |
| Address | WOODSBORO PIKE |
| Comments | Site Walk [Portions of] this will be a tough stream with the amount of building and houses so close to the stream.....Combined reaches into one for site walk. Included section around ag pond for evaluation |
| XCOORD | -77.24486 |
| YCOORD | 39.588314 |
| Stream_Len | 1,862.24 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=358227 |
| Photos | |











































| | |
|------------------------------|---|
| Reach Setting | Parallel to Woodsboro Pike, upstream boundary is neighbor's fence line, downstream boundary is Keymar Rd. |
| Dominant Bed Material | Silt/clay, Sand, silt and sand |
| Secondary Bed Material | Gravel, fine gravels |
| Bed Material Notes | Few cobbles |
| Dominant Bed Form Morphology | Plane-bed |
| Bed Form Morphology Notes | Few riffles, a shallow pool or two - not enough to characterize as weak pool-riffle |
| Vertical Confinement | Culverts, Concrete |
| Vertical Confinement Notes | 2 culverts- one under driveway between lots ~4ft tall, the downstream one under keymar rd ~5ft tall. Lined channel with concrete structure at downstream culvert |
| Vertical Adjustments | Plunge pools, Point bars, Side bars |
| Vertical Adjustments Notes | Shallow plunge pool downstream of mid-reach 4ft culvert, point and side bars in upstream wooded section, not the downstream field |
| Dominant Plan form geometry | Single Thread Meandering |
| Plan Form Geometry Notes | Larger meander bend radius in upstream section, generally smaller meanders downstream |
| Floodplain/Terraces | Floodplains (L/R), Terraces (abandoned floodplain) |
| Floodplains/Terraces Notes | Terraces alternate, floodplain present along both sides, but small in some places in the wooded area; valley confines floodplains and is hilly on right side. Vegetated for entire length - forested upstream grasses downstream, brushy transition area. |
| Lateral confinement | none |
| Lateral adjustments | Bank erosion, Meander migration, Undercut trees, Neck cutoff, Point bar development |
| Lateral Adjustments Notes | Primarily erosion along outer meander bends Undercut banks in a few locations Abandoned meander bends - neck cutoffs Point and side bars |
| Bank Erosion | Moderate |
| Bank Characteristics | |
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 6 ft |

| | |
|---------------------|--------|
| Average Bank Height | 2-4 ft |
| Min Bank Height | 2 ft |

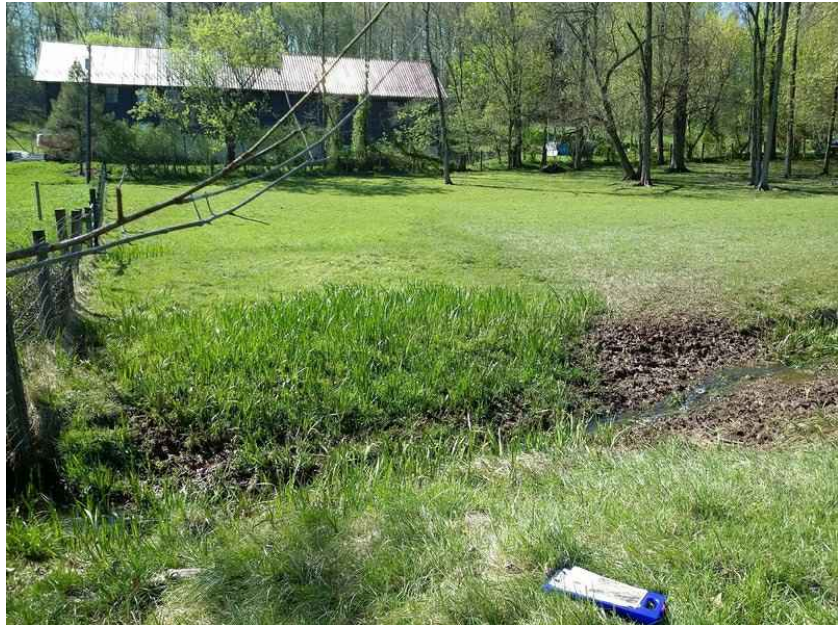
In-Stream Habitat Resources or Concerns

| | |
|--|---|
| In-Stream Habitat Resources and Concerns | Fish passage, Shading, Habitat/flow diversity, LWD, Overhanging banks, Riffle embeddedness |
| Baseflow Depth | Not a concern - adequate |
| Fish Passage | Confined/ restricted by culverts and associated plunge pool |
| Shading | Consistent throughout reach - downstream section shaded by tall grasses |
| Habitat/flow diversity | Very little - few pools, several embedded riffles, some embedded woody debris, a couple overhanging banks |
| Woody Debris | In channel bed, banks, on floodplain. Embedded into bed, acts as debris dam. Some fallen trees restrict flow but don't block it. More prevalent in upstream reach |
| Overhanging banks | Several in upstream reach |
| Riffle embeddedness | Highly embedded |
| Floodplain Connectivity | 2 - incised, limited floodplain area |
| Lateral Stability of Stream Channel | 2 - Moderately stable |
| Riparian Zone | Dominant native and invasive species, Canopy coverage, Mature/specimen trees, Shrubs, Herbaceous |
| Riparian Zone Notes | Box elder, ash, maple, white oak dominant - good mix. Mature trees. Grasses dominant in downstream section and prevalent in upstream section but there is more variation in wooded section. Multi-flora prevalent but not dominant. Honeysuckle present |
| Canopy Percent | 50-75% |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Frogs, few mayflies, caddiesflies, snails and eggs on cobbles in riffles - infrequent |
| Infrastructure | Culverts, Roads, Structures |
| Infrastructure Notes | Keymar Rd downstream with culvert and concrete structure, driveway with culvert mid-reach Stormwater pond seeps into stream |
| Environmental Impacts | Fish passage, Wetlands, Riparian zone, Tree removal, Shading, Soil conditions |
| Environmental Impacts Notes | Could improve fish passage |
| Cultural/Historical Impacts | None |
| Materials for Reuse | Trees for woody debris |
| Restoration Ideas | Culvert improvement for fish passage and repairing/protecting against plunge pool Buffer in downstream section Localized flood plain reconnection and planform adjustment Stabilize seepage/overflow from pond or turn into RSC |

100-Stream, 12737 WOODSBORO PIKE, -77.250958, 39.584687

| | |
|------------|---|
| Created | 2018-04-18 20:58:52 UTC by Akta Patel |
| Updated | 2018-05-10 18:25:15 UTC by Akta Patel |
| Location | 39.584687, -77.250958 |
| FulcrumID | 100-Stream |
| PIN | 47095 |
| TAX_ACCT | 1117363468 |
| Address | 12737 WOODSBORO PIKE |
| Comments | Site Walk [Portions of] this will be a tough stream with the amount of building and houses so close to the stream.....Combined reaches into one for site walk. Included section around ag pond for evaluation |
| XCOORD | -77.250958 |
| YCOORD | 39.584687 |
| Stream_Len | 1,048.69 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=363468 |

Photos



























| | |
|-------------------------------|---|
| Reach Setting | Bounded by Nicholson Road and Lloyd's (property owner's) driveway Fenced into 4 segments used for sheep pasture. Parallel to Woodsboro Pike and railroad. |
| Dominant Bed Material | Silt/clay |
| Secondary Bed Material | Gravel |
| Bed Material Notes | Occasional gravels and cobbles |
| Dominant Bed Form Morphology | Plane-bed |
| Secondary Bed Form Morphology | Pool-riffle |
| Bed Form Morphology Notes | Weak pool-riffle |
| Vertical Confinement | None |
| Vertical Adjustments | Headcuts |
| Vertical Adjustments Notes | Minor localized steep areas |
| Dominant Plan form geometry | Single Thread Meandering |

| | |
|--|--|
| Secondary Plan form geometry | Single Thread Straight |
| Floodplain/Terraces | Floodplains (L/R) |
| Floodplains/Terraces Notes | Left floodplain throughout the reach Right floodplain on a small portion of the reach downstream |
| Lateral confinement | Revetments |
| Lateral Confinement Notes | Rock revetment along both sides of stream near Lloyd's house. Rock revetments embedded in bank scattered throughout reach |
| Lateral adjustments | Bank erosion, Undercut trees |
| Bank Erosion | Moderate |
| Local disturbance contributing to bank erosion | Sheep access to the stream, including crossings Little to no riparian buffer |

Bank Characteristics

| | |
|-------------------------------|---------------------------------------|
| Dominant Bank Materials | Silt/Clay |
| Secondary Bank Materials | Cobble |
| Secondary Bank Material Notes | Rip rap along channel by Loyd's house |

In-Stream Habitat Resources or Concerns

| | |
|--|--|
| In-Stream Habitat Resources and Concerns | Shading, Habitat/flow diversity, LWD |
| Baseflow Depth | Not a problem |
| Fish Passage | Not a problem |
| Shading | Very little - few trees |
| Habitat/flow diversity | Low habitat and flow diversity |
| Woddy Debris | Little to none |
| Overhanging banks | None |
| Riffle embeddedness | Not a problem |
| Floodplain Connectivity | 2 (average) Large floodplain, access to floodplain varies throughout reach - some of the channel is incised. Swale present in floodplain |
| Lateral Stability of Stream Channel | 2 - Moderate |
| Riparian Zone | Herbaceous |
| Riparian Zone Notes | Grass pasture dominate. Minimal tree count |
| Canopy Percent | 0-25% |
| Infrastructure | Bridges, Culverts, Fences |
| Infrastructure Notes | Owner has fences crossing stream to create multiple pastures Owner has small wooden bridge spanning stream in rip-rap area Culverts drain roadway onto floodplain. Impervious area from shed and house downspouts piped into stream |
| Environmental Impacts | Soil conditions |
| Cultural/Historical Impacts | Sheep on site. |
| Materials for Reuse | None |
| Restoration Ideas | Sand filter(s) to treat road runoff Localized floodplain re-connection Construct stable stream crossing for sheep Localized bank grading and bio engineering |

109-Stream, 11702 NICHOLSON RD, -77.252666, 39.597364

| | |
|------------|---|
| Created | 2018-04-18 20:58:52 UTC by Akta Patel |
| Updated | 2018-05-10 18:53:54 UTC by Akta Patel |
| Location | 39.597364, -77.252666 |
| FulcrumID | 109-Stream |
| PIN | 49091 |
| TAX_ACCT | 1111276865 |
| Address | 11702 NICHOLSON RD |
| Comments | Site Walk. Downstream most property owner is wanting the crew to walk their site, Next year this site will have a FCSS monitoring site....Upstream portion of reach is difficult to delineate from aerial, may run into drainage ditch |
| XCOORD | -77.252666 |
| YCOORD | 39.597364 |
| Stream_Len | 4,975.77 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=11&AccountNumber=276865 |
| Photos | |







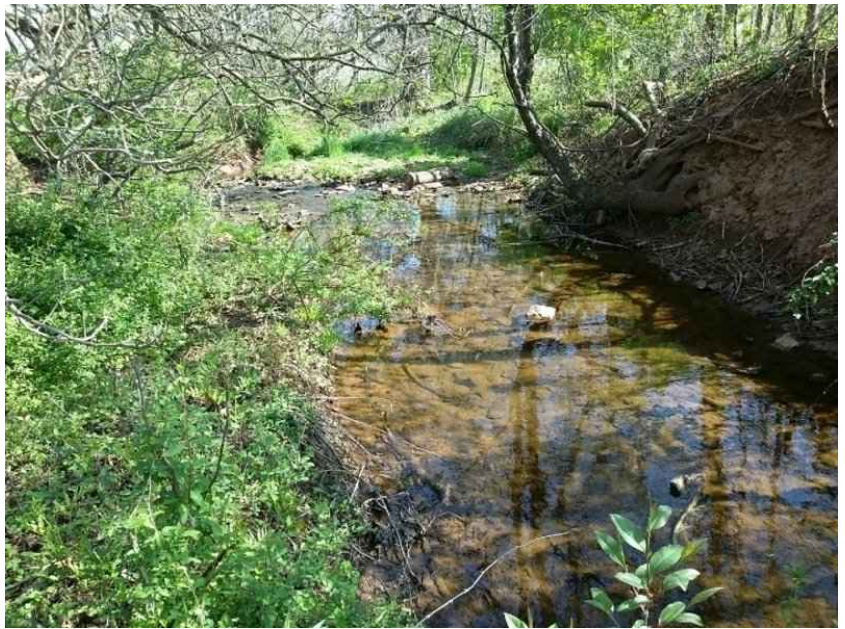










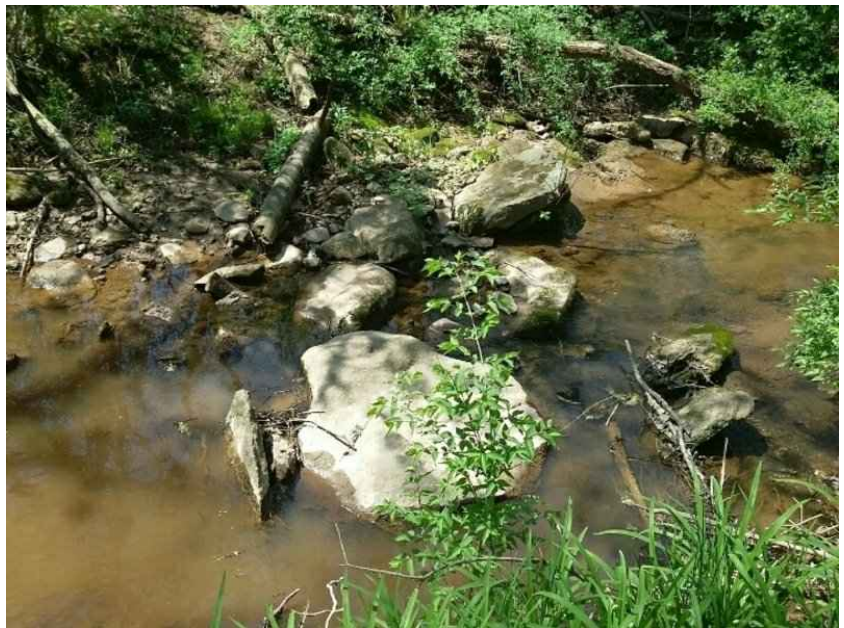




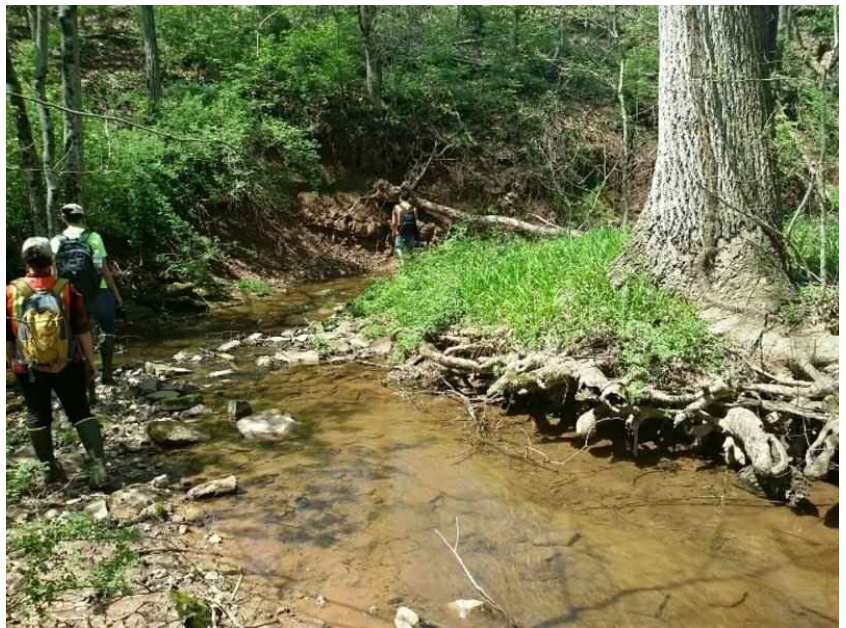
































| | |
|-------------------------------|--|
| Reach Setting | Stambugh property. Bounded by fence crossing the upstream limit of the reach and fence on right upstream floodplain. Downstream boundary is a concrete ford on the property. |
| Dominant Bed Material | Silt/clay, Gravel |
| Secondary Bed Material | Sand, Cobble |
| Bed Material Notes | Gravels are dominant in high energy areas, silt/clay dominant in low energy areas, some sand in point bars, occasional cobbles in riffles |
| Dominant Bed Form Morphology | Plane-bed |
| Secondary Bed Form Morphology | Pool-riffle |
| Bed Form Morphology Notes | Plane bed dominant, well defined pool riffle |
| Vertical Confinement | Concrete, Utility crossings |
| Vertical Confinement Notes | Vehicle concrete causeway at downstream end of reach |
| Vertical Adjustments | Point bars |

| | |
|-----------------------------|---|
| Vertical Adjustments Notes | Difficult to distinguish point bars - observed features that look like point bars but are silt/clay and vegetated |
| Dominant Plan form geometry | Single Thread Meandering |
| Floodplain/Terraces | Floodplains (L/R), Terraces (abandoned floodplain) |
| Floodplains/Terraces Notes | Floodplain on both sides, several abandoned terraces |
| Lateral confinement | Revetments |
| Lateral Confinement Notes | Historical stone revetment for about 50 ft in eroded bank |
| Lateral adjustments | Bank erosion, Meander migration, Undercut trees, Neck cutoff, Chute cutoff, Point bar development |
| Lateral Adjustments Notes | Erosion on the outer meander bends (vertical banks) |
| Bank Erosion | Moderate to severe |

Bank Characteristics

| | |
|------------------------------|--|
| Dominant Bank Materials | Silt/Clay |
| Dominant Bank Material Notes | Clay pan low in channel in certain locations |
| Max Bank Height | 8 ft |
| Average Bank Height | 4 - 6 ft |
| Min Bank Height | 2 ft |

In-Stream Habitat Resources or Concerns

| | |
|--|---|
| In-Stream Habitat Resources and Concerns | Fish passage, Shading, Habitat/flow diversity |
| Baseflow Depth | Not a problem |
| Fish Passage | Concrete crossing is fish passage barrier/impediment |
| Shading | Low |
| Habitat/flow diversity | Somewhat degraded, low diversity - macrophytes in sunny areas, some flow obstruction and sediment deposition but no head cut triggering. Not a lot of high quality riffle-pool habitat but not all plane bed, |
| Woody Debris | Present in-channel, being recruited by falling trees |
| Overhanging banks | Some overhanging trees |
| Riffle embeddedness | Minor |
| Floodplain Connectivity | 3 - incised with large floodplain area. |
| Lateral Stability of Stream Channel | 3 - unstable |
| | Narrow corridor. Soil conservation tree restoration project, medium survival, many tree guards. |
| Riparian Zone | Canopy coverage, Mature/specimen trees, Herbaceous |
| Riparian Zone Notes | A few mature specimens (box elder, willow, sycamore, catalpa); some invasive species - poison ivy, wine berry, multi-flora, garlic mustard; grasses and herbaceous in open sunny areas |
| Canopy Percent | 0-25% |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Macrophytes on large gravels. Minnows, snapping turtles, crayfish. |
| Infrastructure | Structures |
| Infrastructure Notes | Fence at upstream boundary, drain tile, concrete crossing |
| Environmental Impacts | Tree removal, Soil conditions |
| Cultural/Historical Impacts | None. |
| Materials for Reuse | Trees for woody debris, tree tubes |

Restoration Ideas

Legacy sediment project,
Bank grading and bioengineering,
Floodplain restoration,
Fill channel to reconnect floodplain,
Localized plan form adjustments,
Limited armor near power lines

109-Stream_B, 11702 Nicholson Rd, -77.252666, 39.597364

| | |
|-------------------------------|---|
| Created | 2018-05-10 19:33:41 UTC by Akta Patel |
| Updated | 2018-05-10 19:33:41 UTC by Akta Patel |
| Location | 39.597719, -77.253054 |
| FulcrumID | 109-Stream_B |
| PIN | 49091 |
| TAX_ACCT | 1111276865 |
| Address | 11702 Nicholson Rd |
| Comments | Site Walk. Downstream most property owner is wanting the crew to walk their site, Next year this site will have a FCSS monitoring site |
| XCOORD | -77.252666 |
| YCOORD | 39.597364 |
| Stream_Len | 4,975.77 (A+B) |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=11&AccountNumber=276865 |
| Reach Setting | Stambaugh Property. Downstream of concrete ford through stream (upstream reach boundary). Downstream reach boundary is the confluence with Little Pipe Creek. Part of the right floodplain is constrained by a gravel access road. |
| Dominant Bed Material | Gravel, Cobble |
| Secondary Bed Material | Silt/clay |
| Bed Material Notes | Some bedrock present |
| Dominant Bed Form Morphology | Pool-riffle |
| Secondary Bed Form Morphology | Plane-bed |
| Vertical Confinement | Culverts, Bedrock, Concrete |
| Vertical Confinement Notes | One set of 3 culverts - 24" RCP set in concrete as a vehicle crossing Concrete ford at upstream end Some bedrock present in stream bed |
| Vertical Adjustments Notes | No head cuts Confined by shallow bedrock in come locations |
| Dominant Plan form geometry | Single Thread Meandering |
| Plan Form Geometry Notes | Meanders are smaller than upstream section (109-Stream) |
| Floodplain/Terraces | Floodplains (L/R), Terraces (abandoned floodplain) |
| Floodplains/Terraces Notes | Floodplain along much of reach, terraces on right side of reach In some areas on the left side of the reach, the floodplain disappears and the valley slopes to the top of the eroded banks |
| Lateral Confinement Notes | Bedrock present on some of the left bank Gravel road present on a short segment of the right bank |
| Lateral adjustments | Bank erosion, Undercut trees |
| Lateral Adjustments Notes | Bank erosion prevalent on the left bank and outside meander bends |
| Bank Erosion | Moderate to severe |
| Bank Characteristics | |
| Dominant Bank Materials | Silt/Clay |
| Secondary Bank Materials | Bedrock |
| Secondary Bank Material Notes | Present on some segments of the left bank |
| Max Bank Height | 8-10 |

In-Stream Habitat Resources or Concerns

| | |
|--|--|
| In-Stream Habitat Resources and Concerns | Fish passage, LWD, Overhanging banks, Riffle embeddedness |
| Baseflow Depth | Not a problem |
| Fish Passage | Constrained by culverts |
| Shading | Not a problem |
| Habitat/flow diversity | Good |
| Woddy Debris | Present |
| Overhanging banks | Present |
| Riffle embeddedness | Moderate |
| Floodplain Connectivity | 3 - incised, large floodplain in most places |
| Lateral Stability of Stream Channel | 2 - moderately stable |
| Riparian Zone | Dominant native and invasive species, Canopy coverage, Mature/specimen trees, Herbaceous |
| Riparian Zone Notes | Dense herbaceous cover Invasive species Mature trees, some overhanging Poplar, oak, hickory, multi-flora |
| Canopy Percent | 75-100% |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Caddisfly, snails, snapping turtle, frogs, frog eggs |
| Infrastructure | Culverts, Roads, Structures |
| Environmental Impacts | Riparian zone, Tree removal, Shading, Soil conditions, Steep slopes |
| Environmental Impacts Notes | Some steep slopes on left bank |
| Cultural/Historical Impacts | None |
| Materials for Reuse | Boulders, trees for woody debris |
| Restoration Ideas | Improve fish passage at culvert Stop steep slope erosion - soil lifts and bioengineering Move stream away from steep bank and fill in old channel to provide floodplain, grade to meet high steep slope Soft armoring |

111-Stream, 11629 HAUGHS CHURCH RD, -77.260983, 39.58296

| | |
|------------|---|
| Created | 2018-04-18 20:58:52 UTC by Akta Patel |
| Updated | 2018-05-14 16:21:51 UTC by Akta Patel |
| Location | 39.58296, -77.260983 |
| FulcrumID | 111-Stream |
| PIN | 83065 |
| TAX_ACCT | 1111278612 |
| Address | 11629 HAUGHS CHURCH RD |
| Comments | Site Walk. Downstream most property owner is wanting the crew to walk their site, Next year this site will have a FCSS monitoring site....Upstream portion of reach is difficult to delineate from aerial, may run into drainage ditch |
| XCOORD | -77.260983 |
| YCOORD | 39.58296 |
| Stream_Len | 895.41 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=11&AccountNumber=278612 |

Photos











| | |
|-------------------------------|--|
| Reach Setting | Valley, bounded by road d/s. Ú/s tree line at property boundary |
| Dominant Bed Material | Silt/clay |
| Secondary Bed Material | few gravels and algae throughout defining texture |
| Dominant Bed Form Morphology | Plane-bed |
| Secondary Bed Form Morphology | Pool-riffle, weak pools and riffles |
| Vertical Confinement | Culverts, bridge u/s |
| Vertical Adjustments | n/a |
| Dominant Plan form geometry | Single Thread Straight |
| Floodplain/Terraces | Floodplains (L/R), Terraces (abandoned floodplain), small floodplain |
| Lateral confinement | Concrete |
| Lateral adjustments | Bank erosion |
| Bank Erosion | U/s meandering portion , noted cut bank |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 5ft |
| Average Bank Height | 2 ft |
| Min Bank Height | 1 |

In-Stream Habitat Resources or Concerns

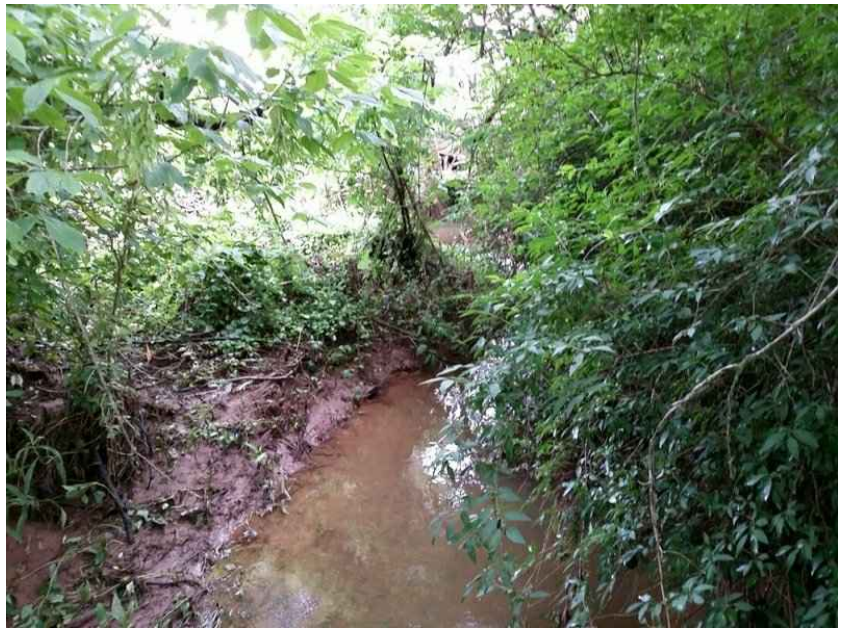
| | |
|-------------------------------------|---|
| Baseflow Depth | Adequate |
| Fish Passage | No barriers observed |
| Shading | 0-25% |
| Habitat/flow diversity | Low, not much pools or ruffles, sediment is uniform... not much habitat for benthics |
| Woddy Debris | 0-25% |
| Overhanging banks | 0-25% |
| Riffle embeddedness | 0-25% |
| Floodplain Connectivity | Connected, 1 |
| Lateral Stability of Stream Channel | Stable, 1 |
| Riparian Zone Notes | Grasses, dual weed, broad leaf dock, thistle, cattails, maple tree, willow tree, common reed throughout |
| Percent Woody | 0-25% |
| Percent Herbaceous | 75-100% |
| Percent Invasive | 50% |
| Canopy Percent | 0-25% |
| Aquatic Habitat Notes | Observed mennus, sediment throughout,. Algae present throughout |
| Infrastructure | Culverts, Roads, Structures |
| Infrastructure Notes | Walking bridge u/s |
| Environmental Impacts | Wetlands, Riparian zone, Soil conditions |
| Cultural/Historical Impacts | N/a |
| Materials for Reuse | Catails? Tree logs |
| Restoration Ideas | Target bioengineering u/s... low energy. Removing cattails to lessen wetlandds. More riparian plantings |

115-Stream, 11602 HAUGHS CHURCH RD, -77.259531, 39.585655

| | |
|------------|---|
| Created | 2018-04-18 20:58:53 UTC by Akta Patel |
| Updated | 2018-07-07 04:37:16 UTC by Akta Patel |
| Location | 39.585655, -77.259531 |
| FulcrumID | 115-Stream |
| PIN | 47165 |
| TAX_ACCT | 1111286976 |
| Address | 11602 HAUGHS CHURCH RD |
| Comments | Site Walk. Downstream most property owner is wanting the crew to walk their site, Next year this site will have a FCSS monitoring site....Upstream portion of reach is difficult to delineate from aerial, may run into drainage ditch |
| XCOORD | -77.259531 |
| YCOORD | 39.585655 |
| Stream_Len | 1,349.89 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=11&AccountNumber=286976 |
| Photos | |































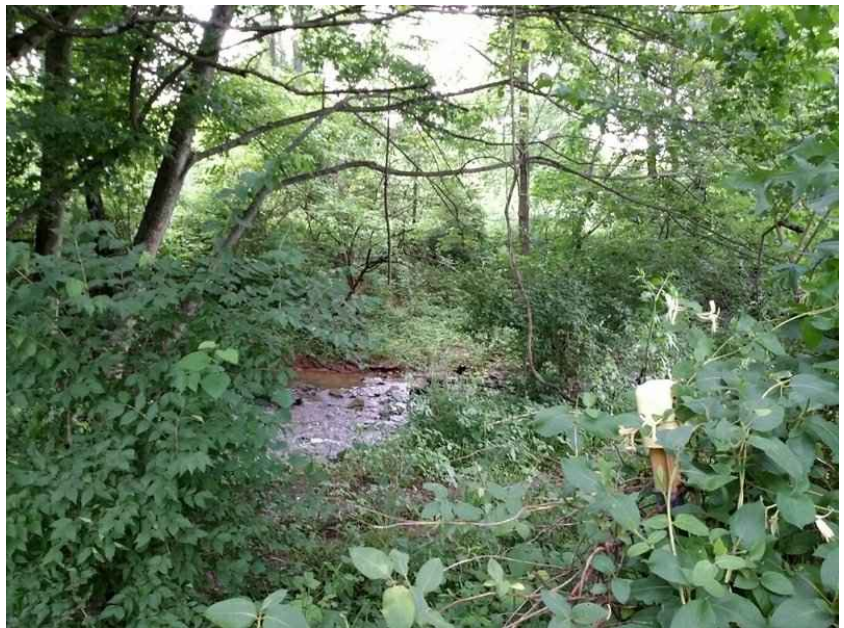














| | |
|--|---|
| Reach Setting | Gently sloping valley, wooded upstream and downstream portions, grassed middle section - homeowners like to keep it mowed. Pond embankment confined stream on right, but stable, no erosion |
| Dominant Bed Material | Gravel |
| Bed Material Notes | Some clay bed upstream of driveway |
| Dominant Bed Form Morphology | Plane-bed |
| Secondary Bed Form Morphology | Pool-riffle |
| Bed Form Morphology Notes | Poorly defined pools |
| Vertical Confinement | Culverts |
| Vertical Confinement Notes | Road Culvert at u/s end of reach, culvert under driveway, culvert under crossing between fields. Culverts on property maintained by landowner - wooden end sections and stone/brick/concrete on embankments. Some erosion u/s of culvert end sections |
| Vertical Adjustments Notes | None |
| Dominant Plan form geometry | Single Thread Meandering |
| Plan Form Geometry Notes | Some grade changes visible but gravelled so no headcuts - maybe higher flows made them look more dramatic |
| Floodplain/Terraces | Floodplains (L/R) |
| Floodplains/Terraces Notes | Grassed section had floodplain access on both sides, l/r alternating floodplain access in wooded section |
| Lateral confinement | Riprap, pond embankment |
| Lateral Confinement Notes | Rip rap and tree roots confine right side u/s of driveway... woody debris jam there forced overland floodplain flow at time of visit and as noted by owner in the past |
| Lateral adjustments | Bank erosion, Undercut trees, Point bar development |
| Lateral Adjustments Notes | Mostly in d/s wooded section. 7ft bank on outer meander bends d/s. Some unvegetated bars. |
| Bank Erosion | Moderate - middle grassed section was mild, u/s and d/s wooded areas were moderate to severe |
| Local disturbance contributing to bank erosion | Grassed section, u/s of road, straightened by other landowner in ~2004 |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
|-------------------------|-----------|

| | |
|---------------------|-----|
| Max Bank Height | 7 |
| Average Bank Height | 3-5 |
| Min Bank Height | 1-2 |

In-Stream Habitat Resources or Concerns

| | |
|--|--|
| In-Stream Habitat Resources and Concerns | Fish passage, Shading, Habitat/flow diversity |
| Baseflow Depth | Hard to say with the high flow |
| Fish Passage | Culverts impeded passage |
| Shading | None in middle grassed section, good in wooded sections |
| Habitat/flow diversity | Low in grassed section, better in wooded - woody debris, more defined riffles and meanders |
| Woody Debris | Large jam u/s of driveway culvert, little elsewhere |
| Overhanging banks | Few - some in d/s section |
| Riffle embeddedness | Low |
| Floodplain Connectivity | Varied... overall, connected. Better connected in middle, connected throughout at high flows, higher banks d/s, esp on left side outer meander bends |
| Lateral Stability of Stream Channel | Moderate - mid section stable, u/s and d/s less so - erosion evident |
| Riparian Zone | Dominant native and invasive species, Canopy coverage, Mature/specimen trees, Herbaceous |
| Riparian Zone Notes | Grassed mid section. Mature trees u/s and d/s, but not a very large riparian area - could try to expand into wet seemingly unused floodplain d/s. Jewelweed, honeysuckle |
| Percent Woody | 25-50% |
| Percent Herbaceous | 100% |
| Percent Invasive | Unknown |
| Canopy Percent | 25-50% |
| Aquatic Habitat Notes | Little diversity. No fauna seen |
| Infrastructure | Culverts, Embankments |
| Infrastructure Notes | See culvert notes and photos above. Pond embankment. Electrical fencing for dogs and horses. |
| Environmental Impacts | Tree removal |
| Cultural/Historical Impacts | Horse enclosure. Pond. Owner likes neat grassed area |
| Materials for Reuse | Rip rap, culvert materials |
| Restoration Ideas | Improved riparian corridor - some water loving and attractive trees. Invasive management. Bank grading and bioengineering for stabilization |

117-Stream, 12503 WOODSBORO PIKE, -77.265171, 39.576181

| | |
|------------|---|
| Created | 2018-04-18 20:58:53 UTC by Akta Patel |
| Updated | 2018-05-10 17:30:21 UTC by Akta Patel |
| Location | 39.576181, -77.265171 |
| FulcrumID | 117-Stream |
| PIN | 50503 |
| TAX_ACCT | 1117358340 |
| Address | 12503 WOODSBORO PIKE |
| Comments | Site Walk. Downstream most property owner is wanting the crew to walk their site, Next year this site will have a FCSS monitoring site....Upstream portion of reach is difficult to delineate from aerial, may run into drainage ditch |
| XCOORD | -77.265171 |
| YCOORD | 39.576181 |
| Stream_Len | 115.53 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=358340 |

Photos

































| | |
|-------------------------------|---|
| Reach Setting | Upstream of property fence crossing is reach A, downstream is reach B. Upstream end of reach A begins at culvert outfall from under railroad. Reach A passes under Woodsboro Pike and is constrained by infrastructure. Downstream end of reach B is bounded by another property fence. |
| Dominant Bed Material | Silt/clay, Sand |
| Secondary Bed Material | Gravel, Cobble |
| Bed Material Notes | Sand and silt/clay dominant in riffles and pools. Gravel, cobble, and construction debris are present as well, especially in upper part of Reach B. |
| Dominant Bed Form Morphology | Plane-bed |
| Secondary Bed Form Morphology | Pool-riffle |
| Bed Form Morphology Notes | Plane-bed is dominant, weak secondary pool-riffle form |
| Vertical Confinement | Culverts, Pipes, Utility crossings |

| | |
|--|--|
| Vertical Confinement Notes | Septic pipe crosses over stream in Reach A (septic field on right floodplain). Culvert under railroad tracks at upstream end of reach. Culvert under Woodsboro Pike. High tension line runs over Reach B. |
| Vertical Adjustments | Plunge pools, Point bars |
| Vertical Adjustments Notes | Plunge pool at outfall from under railroad, some side bars at Reach B |
| Dominant Plan form geometry | Single Thread Meandering |
| Secondary Plan form geometry | Single Thread Straight |
| Plan Form Geometry Notes | Upper most part of reach A is straight |
| Floodplain/Terraces | Floodplains (L/R), Terraces (abandoned floodplain) |
| Floodplains/Terraces Notes | Reach A does not have a left floodplain but does have a right floodplain, Upper most part of reach A is fully confined with no floodplain. Reach B has both floodplains |
| Lateral confinement | Revetments |
| Lateral Confinement Notes | Upper part of reach A is confined in narrow valley with steep slope. Few scattered revetments with small lengths. |
| Lateral adjustments | Bank erosion, Meander migration, Point bar development |
| Lateral Adjustments Notes | Bank erosion on outer banks, especially on Reach B |
| Bank Erosion | Moderate |
| Local disturbance contributing to bank erosion | High energy at outfall Lack of quality riparian buffer |

Bank Characteristics

| | |
|-------------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Dominant Bank Material Notes | - |
| Secondary Bank Material Notes | - |
| Max Bank Height | 8 |
| Average Bank Height | 4 |
| Min Bank Height | 2 |

In-Stream Habitat Resources or Concerns

| | |
|--|--|
| In-Stream Habitat Resources and Concerns | Fish passage, Shading, Habitat/flow diversity |
| Baseflow Depth | Not a problem |
| Fish Passage | Fish passage impediments - culvert, debris dam |
| Shading | No shade |
| Habitat/flow diversity | Low habitat /flow diversity, low habitat quality |
| Woddy Debris | Little to none |
| Overhanging banks | None |
| Riffle embeddedness | Minor to none |
| Floodplain Connectivity | 3 - incised with large floodplain |
| Lateral Stability of Stream Channel | Reach A is stable (1). Reach B is unstable (3) - meander migration Overall - 2. |
| Riparian Zone | Mature/specimen trees, Shrubs, Herbaceous |
| Riparian Zone Notes | Poor riparian corridor Grass up to top of bank. Few trees and shrubs in reach A and upstream part of reach B |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Minnows |

| | |
|-----------------------------|---|
| Infrastructure | Nonconflicting utilities) |
| Infrastructure Notes | Septic pipe and high tension electric lines observed |
| Environmental Impacts | Soil conditions |
| Environmental Impacts Notes | Could improve fish passage and shading through restoration |
| Cultural/Historical Impacts | None |
| Materials for Reuse | None |
| Restoration Ideas | Legacy sediment RSC for upstream portion of reach A Bank grading Establish left bank riparian buffer |

120-Stream, 12610-12600 MD-194, Keymar, MD, -77.265775, 39.57318

| | |
|------------|---|
| Created | 2018-04-18 20:58:53 UTC by Akta Patel |
| Updated | 2018-06-11 18:32:12 UTC by Akta Patel |
| Location | 39.57318, -77.265775 |
| FulcrumID | 120-Stream |
| PIN | 50080 |
| TAX_ACCT | 1117361767 |
| Address | 12610-12600 MD-194, Keymar, MD |
| Comments | Site Walk. Downstream most property owner is wanting the crew to walk their site, Next year this site will have a FCSS monitoring site....Upstream portion of reach is difficult to delineate from aerial, may run into drainage ditch |
| XCOORD | -77.265775 |
| YCOORD | 39.57318 |
| Stream_Len | 334.31 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=361767 |

Photos













| | |
|------------------------------|--|
| Reach Setting | Grassed floodplains and wetland, horse pasture, sloping valley |
| Dominant Bed Material | Gravel |
| Bed Material Notes | Some bedrock confinement |
| Dominant Bed Form Morphology | Plane-bed, Pool-riffle |
| Bed Form Morphology Notes | Weak pool riffle |
| Vertical Confinement | Culverts, Bedrock |
| Vertical Confinement Notes | Small, sporadic bedrock |
| Vertical Adjustments | Point bars |
| Dominant Plan form geometry | Single Thread Meandering |
| Floodplain/Terraces | Floodplains (L/R) |
| Floodplains/Terraces Notes | Access on both sides |
| Lateral Confinement Notes | None |
| Lateral adjustments | Bank erosion, Meander migration |

| | |
|--|---|
| Lateral Adjustments Notes | Little evidence of active widening/erosion |
| Bank Erosion | Mild |
| Local disturbance contributing to bank erosion | Horse access to stream along entire length, hoof prints all over floodplain |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 2 |
| Average Bank Height | 0.5 |
| Min Bank Height | 0 |

In-Stream Habitat Resources or Concerns

| | |
|-------------------------------------|---|
| Baseflow Depth | After storm |
| Fish Passage | Only at culvert |
| Shading | Poor |
| Habitat/flow diversity | Poor, some pools or deeper thalweg |
| Woddy Debris | One small jam |
| Overhanging banks | None |
| Riffle embeddedness | Low |
| Floodplain Connectivity | Connected |
| Lateral Stability of Stream Channel | Stable |
| Riparian Zone Notes | Intermittent young to mature trees 10plus on left floodplain - possible restoration effort, grasses and, low herbaceous, honeysuckle, few wetland species |
| Percent Woody | 10-25% |
| Percent Herbaceous | 90-100% |
| Percent Invasive | Unknown |
| Canopy Percent | 10-25% |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Minnows |
| Infrastructure | Culverts, Nonconflicting utilities), fence for horse pasture |
| Infrastructure Notes | Power line |
| Environmental Impacts | Wetlands |
| Environmental Impacts Notes | Vernal pool, wetlands, hillside seeps |
| Cultural/Historical Impacts | Horse pasture |
| Restoration Ideas | Bioengineering, live stakes, floodplain restoration, horse exclusion fence |

121-Stream, 12418 WARNER RD, -77.265802, 39.574526

| | |
|------------|---|
| Created | 2018-04-18 20:58:53 UTC by Akta Patel |
| Updated | 2018-07-07 02:54:51 UTC by Akta Patel |
| Location | 39.574526, -77.265802 |
| FulcrumID | 121-Stream |
| PIN | 50081 |
| TAX_ACCT | 1117362747 |
| Address | 12418 WARNER RD |
| Comments | Site Walk. Downstream most property owner is wanting the crew to walk their site, Next year this site will have a FCSS monitoring site....Upstream portion of reach is difficult to delineate from aerial, may run into drainage ditch |
| XCOORD | -77.265802 |
| YCOORD | 39.574526 |
| Stream_Len | 673.08 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=362747 |
| Photos | |

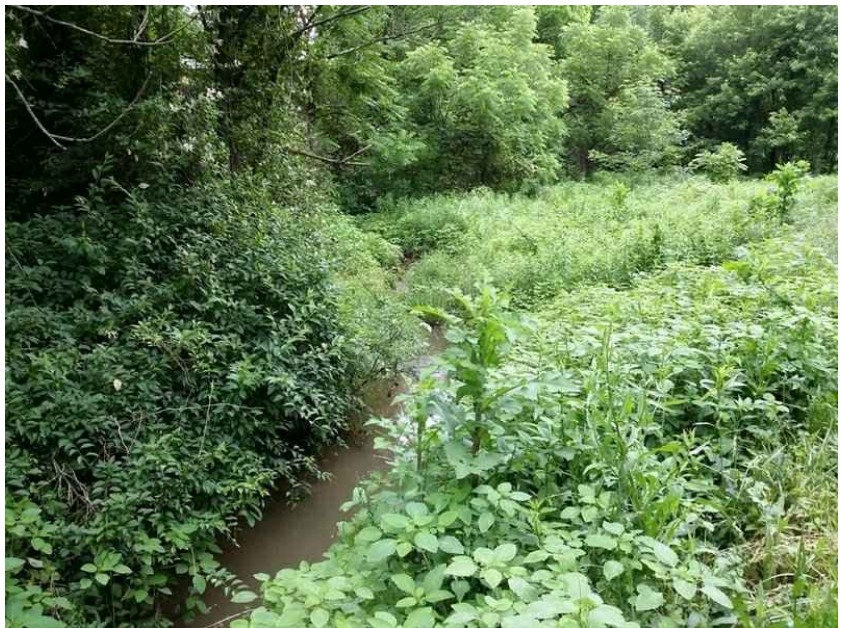










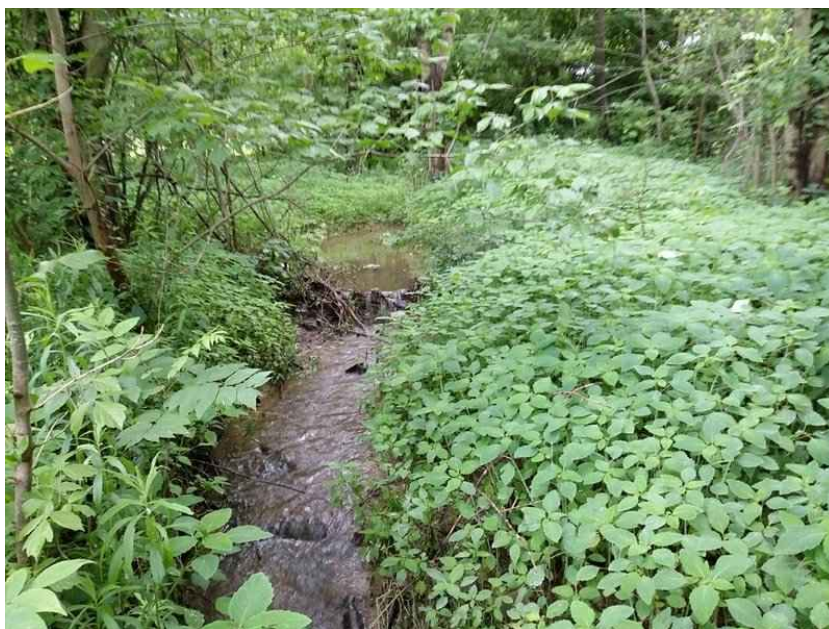












| | |
|--|---|
| Reach Setting | Sloping valley, confined by hillslope on left bank and road on rb |
| Dominant Bed Material | Gravel |
| Dominant Bed Form Morphology | Plane-bed, Pool-riffle |
| Vertical Confinement | Culverts |
| Vertical Adjustments | debris jam step near d/s end of reach |
| Dominant Plan form geometry | Single Thread Meandering |
| Floodplain/Terraces | Floodplains (L/R) |
| Floodplains/Terraces Notes | Well vegetated, wider on left than right - confined by roadway |
| Lateral confinement | road embankment |
| Lateral Confinement Notes | Some rip rap on valley side by driveway bank |
| Lateral Adjustments Notes | None |
| Bank Erosion | None - vegetation |
| Local disturbance contributing to bank erosion | Upstream land use |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 5 ft |
| Average Bank Height | 2 |
| Min Bank Height | 1 |

In-Stream Habitat Resources or Concerns

| | |
|-------------------------------------|--|
| Baseflow Depth | Deeper thalweg |
| Fish Passage | Culvert d/s is a barrier |
| Shading | Well shaded |
| Habitat/flow diversity | few pools/riffles, okay to good diversity |
| Woddy Debris | None to little |
| Overhanging banks | None |
| Riffle embeddedness | Low |
| Floodplain Connectivity | Connected |
| Lateral Stability of Stream Channel | Stable |
| Riparian Zone | Dominant native and invasive species, Canopy coverage, Understory, Mature/specimen trees, Shrubs, Herbaceous |
| Riparian Zone Notes | Jewelweed, multi flora, poison ivy, honeysuckle, mature trees |
| Percent Woody | 60-80% |
| Percent Herbaceous | 100% |
| Percent Invasive | 0-25% |
| Canopy Percent | 50-75% |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Minnows |
| Infrastructure | Culverts, Roads, Embankments |
| Infrastructure Notes | Road and driveway embankments, power lines |
| Environmental Impacts | Riparian zone, Tree removal, Shading, Soil conditions |
| Cultural/Historical Impacts | None |
| Materials for Reuse | None |
| Restoration Ideas | Low priority, well vegetated banks and riparian corridor |

123-Stream, 12517A WOODSBORO PIKE, -77.265254, 39.575713

| | |
|------------|---|
| Created | 2018-04-18 20:58:54 UTC by Akta Patel |
| Updated | 2018-07-07 03:46:24 UTC by Akta Patel |
| Location | 39.575713, -77.265254 |
| FulcrumID | 123-Stream |
| PIN | 49054 |
| TAX_ACCT | 1117366076 |
| Address | 12517A WOODSBORO PIKE |
| Comments | Site Walk. Downstream most property owner is wanting the crew to walk their site, Next year this site will have a FCSS monitoring site....Upstream portion of reach is difficult to delineate from aerial, may run into drainage ditch |
| XCOORD | -77.265254 |
| YCOORD | 39.575713 |
| Stream_Len | 108.08 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=366076 |
| Photos | |









| | |
|------------------------------|---|
| Reach Setting | D/s of Warner Road, u/s of and runs parallel to the railroad track and Woodsboro Pike. Drainage ditch u/s on right side of stream, in plastic culvert under access road |
| Dominant Bed Material | Silt/clay |
| Secondary Bed Material | Gravel |
| Dominant Bed Form Morphology | Plane-bed |
| Bed Form Morphology Notes | No distinguished features d/s of culvert. Weak pool-riffle in d/s railroad property |
| Vertical Confinement | Culverts |
| Vertical Confinement Notes | D/s and u/s culverts |
| Vertical Adjustments Notes | None |
| Dominant Plan form geometry | Single Thread Straight |
| Plan Form Geometry Notes | Straight d/s of culvert, few small meanders on d/s railroad property |
| Floodplains/Terraces Notes | Left floodplain is railroad embankment, right is access road for property owner. |
| Lateral confinement | Revetments, Riprap |

| | |
|--|---|
| Lateral Confinement Notes | Owner has been adding revetments to right bank just d/s of culvert, to stabilize the stream bank. Left bank is railway embankment |
| Lateral adjustments | Bank erosion |
| Lateral Adjustments Notes | Owner noted bank erosion, some was observed on right bank just d/s of culvert. Banks vegetated - little erosion |
| Bank Erosion | Very little |
| Local disturbance contributing to bank erosion | U/s roadway |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 3 |
| Average Bank Height | 2 |
| Min Bank Height | 0.5 |

In-Stream Habitat Resources or Concerns

| | |
|--|---|
| In-Stream Habitat Resources and Concerns | Baseflow depth, Fish passage, Habitat/flow diversity |
| Baseflow Depth | Not very deep |
| Fish Passage | Inhibited by culverts that bound reach, shallow flow |
| Shading | Low, especially on left bank |
| Habitat/flow diversity | Low - some riffles, poorly defined pools |
| Woody Debris | None |
| Overhanging banks | None |
| Riffle embeddedness | Low |
| Floodplain Connectivity | 1 - connected |
| Lateral Stability of Stream Channel | 1 - stable |
| Riparian Zone | Mature/specimen trees, Herbaceous |
| Riparian Zone Notes | Spatterdock close to channel, grass/low herbaceous on left floodplain, owner cuts back/mows right floodplain. Few trees on right floodplain |
| Percent Woody | 25-50 |
| Percent Herbaceous | 100 |
| Percent Invasive | 25-50 |
| Canopy Percent | 50% |
| Aquatic Habitat Notes | None observed |
| Infrastructure | Culverts, Embankments, Railroads |
| Infrastructure Notes | Culverts u/s and d/s of reach. Railroad embankment on left bank, access road on right bank |
| Environmental Impacts Notes | Few to none - already a heavily impacted area |
| Cultural/Historical Impacts | Railroad, access road, owner doesn't want area to look overgrown (keeps mowing) or eroded (places rip rap) |
| Materials for Reuse | Placed rip rap |
| Restoration Ideas | Mostly railroad property - hard to gain permission to access or modify. Riparian planting, minor grading, revetment/bank armoring near culvert outlet |

130-Stream, 13202 Detour Road, -77.255282, 39.590687

| | |
|------------|---|
| Created | 2018-04-18 20:58:53 UTC by Akta Patel |
| Updated | 2018-07-09 08:45:56 UTC by Akta Patel |
| Location | 39.590687, -77.255282 |
| FulcrumID | 130-Stream |
| PIN | 50047 |
| TAX_ACCT | 1111286534 |
| Address | 13202 Detour Road |
| Comments | Site Walk requested by property owner |
| XCOORD | -77.255282 |
| YCOORD | 39.590687 |
| Stream_Len | 2,202.13 |
| Restoratio | Stream |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=11&AccountNumber=282202 |

Photos

















































































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|------------------------------|--|
| Reach Setting | Wide gentle valley, headwaters area on farm. Reach begins upstream of farm pond, ends at fenced property line |
| Dominant Bed Material | Cobble |
| Secondary Bed Material | Silt/clay |
| Bed Material Notes | Cobble dominant, some bedrock downstream, clay dominant upstream, smaller gravels throughout |
| Dominant Bed Form Morphology | Pool-riffle |
| Bed Form Morphology Notes | Weak pool-rifle. Small pools, cobble riffles |
| Vertical Confinement | Culverts, Bedrock, Concrete |
| Vertical Confinement Notes | Culvert delivers stormwater from buildings into the stream, bedrock in downstream section - esp near property line |
| Vertical Adjustments | Headcuts |
| Vertical Adjustments Notes | A headcut in the clay upstream section, stabilized headcut in downstream section with cobble, start of stream appears to be a headcut at drainage confluence |

| | |
|--|--|
| Dominant Plan form geometry | Single Thread Meandering |
| Plan Form Geometry Notes | U/s may be a little braided |
| Floodplain/Terraces | Floodplains (L/R) |
| Floodplains/Terraces Notes | Large floodplain on both sides of the channel throughout reach. Heavily impacted by cattle usage |
| Lateral confinement | Concrete |
| Lateral Confinement Notes | Confined by driveway and culvert |
| Lateral adjustments | Bank erosion, Meander migration, Undercut trees |
| Lateral Adjustments Notes | Bank erosion increases moving d/s, some undercut trees d/s, meander migration u/s |
| Bank Erosion | Severe |
| Local disturbance contributing to bank erosion | Cattle heavily used stream d/s of driveway. U/s of driveway, evidence of past cattle usage |

Bank Characteristics

| | |
|-------------------------|-----------|
| Dominant Bank Materials | Silt/Clay |
| Max Bank Height | 5 |
| Average Bank Height | 3 |
| Min Bank Height | 1 |

In-Stream Habitat Resources or Concerns

| | |
|--|---|
| In-Stream Habitat Resources and Concerns | Baseflow depth, Fish passage, Shading, Habitat/flow diversity, Overhanging banks |
| Baseflow Depth | Low depth, especially u/s of drive |
| Fish Passage | Inhibited by culvert and bedrock |
| Shading | Poor - few scattered trees |
| Habitat/flow diversity | Low very small pools, clay bed and larger cobbles reduce space for macros |
| Woddy Debris | Very limited |
| Overhanging banks | Around tree roots in d/s section, near property line |
| Riffle embeddedness | Low |
| Floodplain Connectivity | 3 - incised, large floodplain |
| Lateral Stability of Stream Channel | 3 - unstable |
| Riparian Zone | Mature/specimen trees, Shrubs, Herbaceous |
| Riparian Zone Notes | Few mature trees d/s of drive, multiflora rose shrub, grassed floodplain heavily eroded by cow usage |
| Percent Woody | 0-25 |
| Percent Herbaceous | 75-100 |
| Percent Invasive | Unknown |
| Canopy Percent | 0-25 |
| Aquatic Habitat | Aquatic Flora/Fauna |
| Aquatic Habitat Notes | Frogs, snake observed |
| Infrastructure | Culverts, Roads, Embankments |
| Infrastructure Notes | Culvert under driveway, concrete swale and pipe delivers drainage into stream. Pond and driveway embankments impact u/s section |
| Environmental Impacts | Soil conditions |
| Environmental Impacts Notes | Few trees/shrubs, low fish passage to impact |
| Cultural/Historical Impacts | Pond embankment, driveway, cattle pasture |
| Materials for Reuse | Cobbles |

Restoration Ideas

Floodplain reconnection and bank grading, riparian zone restoration, cattle fencing, nickpoint stabilization esp. at start of channel - in-channel stone or rsc? Rsc or grass swale where existing concrete channel is

1-BMP, 9019 Tarr Drive, New Windsor, MD 21779, -77.119938, 39.484868

| | |
|-----------|---|
| Created | 2018-05-18 16:16:48 UTC by Akta Patel |
| Updated | 2018-05-22 18:01:41 UTC by Akta Patel |
| Location | 39.484868, -77.119938 |
| FulcrumID | 1-BMP |
| PIN | 46925 |
| TAX_ACCT | 1119390691 |
| Address | 9019 Tarr Drive, New Windsor, MD 21779 |
| Comments | Evaluate the stormdrain easement that is on this property. Appears there may be opportunities to provide a grass swale or something similar. |
| XCOORD | -77.119938 |
| YCOORD | 39.484868 |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=19&AccountNumber=390691 |

Photos





Property to the right of the ex. carpet and rip rap flow path



To the left of the ex. carpet and rip rap flow path



Minor erosion downstream of carpeted area.







Inlet to culvert under driveway on parcel.



| | |
|----------------------|--|
| Impervious Area (ac) | 0.98 |
| Restoration | BMP |
| Opportunity | Road and some roof runoff in development. Grass Swale or rsc |

BMPs

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|--|--|
| BMP Setting | Culdesac in small development. |
| Drainage Area Setting | Drainage from road ditches, single family homes. Many trees and well grassed lawns. Debris from recent storm flows evident - small branches and pine needles/leaf litter |
| Erosivity Severity | Mild |
| Erosion Notes | Potential erosion covered by carpet weighted with rip rap. |
| Utility Conflicts | 3. No Conflicts |
| ROW Requirements/Property Ownership | Existing Drainage Easement |
| Constructability/Access | 3. Easy |
| Infrastructure | none |
| Infrastructure Notes | Culverts under driveways upstream |
| Environmental Impacts | Tree removal, Shading |
| Environmental Impacts Notes | No important species to save - mix of natives and invasives |
| Cultural/Historical Impacts | None |
| Materials for Reuse | Wood piles, trees, rip rap, carpet |
| Public Safety | 3. No public safety concern |
| Partnership Opportunities | 1. No partnership opportunities |
| Public Visibility/Outreach Opportunity | 1. Low visibility |

Ranking

| | |
|-----------------------------------|---|
| Impervious Area Credit Rank | 1 |
| Stormwater Era Rank | 1 |
| Planning Cost Rank | 3 |
| Impervious Area Cost Rank | 3 |
| Conflicts Rank | 3 |
| Easements Rank | 2 |
| Maintenance Rank | 3 |
| Proximity to Karst | 3 |
| Permitting Requirements Rank | 3 |
| Stream Restoration Proximity Rank | 1 |
| Acceptance Rank | 3 |
| Safety Rank | 3 |
| Partnership Rank | 2 |
| Visibility Rank | 2 |

2-BMP, 11721 BUNKER HILL CT, Union Bridge, MD 21791, -77.217221, 39.556176

| | |
|-----------|---|
| Created | 2018-05-18 16:16:49 UTC by Akta Patel |
| Updated | 2018-05-22 18:12:30 UTC by Akta Patel |
| Location | 39.556176, -77.217221 |
| FulcrumID | 2-BMP |
| PIN | 51964 |
| TAX_ACCT | 1117361171 |
| Address | 11721 BUNKER HILL CT, Union Bridge, MD 21791 |
| Comments | Site Walk. Add new stormwater within drainage easement |
| XCOORD | -77.217221 |
| YCOORD | 39.556176 |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=361171 |

Photos









| | |
|----------------------|---|
| Impervious Area (ac) | 0.83 |
| Restoration | BMP |
| Opprtunity | Road and some roof runoff in development. Grass Swale |

BMPs

| | |
|--|---|
| BMP Setting | Vegetated boundary between properties, with embedded rip rap/cobbles, trees, herbaceous species, and shrubs |
| Drainage Area Setting | Development - grassed lawns and trees |
| Erosivity Severity | Mild |
| Erosion Notes | No erosion on stabilized, vegetated slope. Removing vegetation to create RSC could trigger erosion. |
| Utility Conflicts | 3. No Conflicts |
| ROW Requirements/Property Ownership | Existing Drainage Easement |
| Constructability/Access | 2. Moderate |
| Infrastructure | None |
| Infrastructure Notes | May be underground utilities for homes. Not marked. |
| Environmental Impacts | Tree removal, Steep slopes |
| Environmental Impacts Notes | Trees used as property boundary and screen between houses - homeowners would likely want to keep these. One tree appeared to be landscaped. Other species were native but not high value. |
| Cultural/Historical Impacts | none |
| Materials for Reuse | rip rap (embedded in slope) |
| Public Safety | 3. No public safety concern |
| Partnership Opportunities | 2. Opportunities to partner with 1-3 outside stakeholders |
| Public Visibility/Outreach Opportunity | 1. Low visibility |

Ranking

| | |
|-----------------------------------|---|
| Impervious Area Credit Rank | 1 |
| Stormwater Era Rank | 1 |
| Planning Cost Rank | 3 |
| Impervious Area Cost Rank | 3 |
| Conflicts Rank | 3 |
| Easements Rank | 1 |
| Maintenance Rank | 3 |
| Proximity to Karst | 3 |
| Permitting Requirements Rank | 3 |
| Stream Restoration Proximity Rank | 1 |
| Acceptance Rank | 3 |
| Safety Rank | 3 |
| Partnership Rank | 2 |
| Visibility Rank | 3 |

3-BMP, 11721 BUNKER HILL CT, Union Bridge, MD 21791, -77.216848, 39.556858

| | |
|-----------|---|
| Created | 2018-05-18 16:16:49 UTC by Akta Patel |
| Updated | 2018-05-22 18:10:06 UTC by Akta Patel |
| Location | 39.556858, -77.216848 |
| FulcrumID | 3-BMP |
| PIN | 51964 |
| TAX_ACCT | 1117361171 |
| Address | 11721 BUNKER HILL CT, Union Bridge, MD 21791 |
| Comments | Site Walk. Add new stormwater within drainage easement |
| XCOORD | -77.216848 |
| YCOORD | 39.556858 |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=17&AccountNumber=361171 |

Photos



Concentrated flow path - stormwater thalweg



Concentrated stormwater flow path upstream of previous image



Development drainage swale. No culverts.



Concentrated flow on the right side of parcel driveway.



Field where sand filter could be located. White dot is septic system access.



Erosion upstream of driveway, on right side (when looking downstream)



Property line, area for potential grass swale/RSC. Erosion on right side of driveway.

| | |
|----------------------|--|
| Impervious Area (ac) | 1.24 |
| Restoration | BMP |
| Opportunity | Road and some roof runoff in development. Sand Filter. Vegetated french drain, grass swale at driveway edges |

BMPs

| | |
|--|---|
| BMP Setting | Grassed lawn, development cul-de-sac |
| Drainage Area Setting | Development - grassed lawns and trees |
| Erosivity Severity | Mild |
| Erosion Notes | Just at driveway edges |
| Utility Conflicts | 2. Minor Conflicts |
| ROW Requirements/Property Ownership | Existing Drainage Easement |
| Constructability/Access | 2. Moderate |
| Infrastructure | septic field |
| Infrastructure Notes | May be underground utilities for homes. Not marked. |
| Environmental Impacts | Steep slopes |
| Environmental Impacts Notes | Home owner driveway down part of the steep slope |
| Cultural/Historical Impacts | None |
| Materials for Reuse | None |
| Public Safety | 3. No public safety concern |
| Partnership Opportunities | 2. Opportunities to partner with 1-3 outside stakeholders |
| Public Visibility/Outreach Opportunity | 1. Low visibility |

Ranking

| | |
|-----------------------------------|---|
| Impervious Area Credit Rank | 1 |
| Stormwater Era Rank | 1 |
| Planning Cost Rank | 3 |
| Impervious Area Cost Rank | 1 |
| Conflicts Rank | 3 |
| Easements Rank | 1 |
| Maintenance Rank | 2 |
| Proximity to Karst | 3 |
| Permitting Requirements Rank | 3 |
| Stream Restoration Proximity Rank | 3 |
| Acceptance Rank | 2 |
| Safety Rank | 3 |
| Partnership Rank | 2 |
| Visibility Rank | 3 |

5-BMP, 12435 Woodsboro Pike, Keymar, MD 21757, -77.269668, 39.574772

| | |
|-----------|---|
| Created | 2018-05-18 16:16:48 UTC by Akta Patel |
| Updated | 2018-05-22 17:58:16 UTC by Akta Patel |
| Location | 39.574772, -77.269668 |
| FulcrumID | 5-BMP |
| PIN | 50404 |
| TAX_ACCT | 1111283799 |
| Address | 12435 Woodsboro Pike, Keymar, MD 21757 |
| Comments | Site walk. Possibly look at the drainage ditch than runs east of the building. could be a good rsc or grass swale |
| XCOORD | -77.269668 |
| YCOORD | 39.574772 |
| WEBLINK | http://sdat.dat.maryland.gov/RealProperty/Pages/viewdetails.aspx?County=11&SearchType=ACCT&District=11&AccountNumber=283799 |

Photos



Roof drains run over parking lot into ex. grass swale



Some of parking area is gravel. Some ponding especially near edge of asphalt area.



Grass swale in front of property. Drains into ex. grass swale on side of property (then into stream).

| | |
|----------------------|--|
| Impervious Area (ac) | 0.95 |
| Restoration | BMP |
| Opprtunity | Large (flat) roof and parking lot. RSC or grass swale. |

BMPs

| | |
|--|--|
| BMP Setting | Grassed swale with some gravels at the bottome. Stable condition |
| Drainage Area Setting | Runoff from road drainage ditches, parking lot, and roof surface. Could direct roof drains into bmp for treatment before the swale forms into stream/joins larger stream. RSC? |
| Erosivity Severity | Mild |
| Erosion Notes | Well grassed, ponding in some spots along driveway edge but no erosion |
| Utility Conflicts | 2. Minor Conflicts |
| ROW Requirements/Property Ownership | Easement Required |
| Constructability/Access | 3. Easy |
| Infrastructure | Culverts, utility pole at corner of road, edge of grass swale |
| Infrastructure Notes | Inlets from road drainage ditches are concrete culverts, one with metal end section, 12in-18in rcp pipe mid-swale |
| Environmental Impacts | none |
| Environmental Impacts Notes | Maybe removing some trees, but likely not if only working on grass swale before it deepens into stream |
| Cultural/Historical Impacts | None |
| Materials for Reuse | None |
| Public Safety | 3. No public safety concern |
| Partnership Opportunities | 2. Opportunities to partner with 1-3 outside stakeholders |
| Public Visibility/Outreach Opportunity | 2. Moderate visibility |

Ranking

| | |
|-----------------------------|---|
| Impervious Area Credit Rank | 1 |
| Stormwater Era Rank | 1 |
| Planning Cost Rank | 3 |
| Impervious Area Cost Rank | 2 |
| Conflicts Rank | 3 |

| | |
|-----------------------------------|---|
| Easements Rank | 1 |
| Maintenance Rank | 2 |
| Proximity to Karst | 3 |
| Permitting Requirements Rank | 3 |
| Stream Restoration Proximity Rank | 3 |
| Acceptance Rank | 3 |
| Safety Rank | 3 |
| Partnership Rank | 2 |
| Visibility Rank | 2 |